SICK insight
SICK'S CUSTOMER MAGAZINE

01 | 2005 www.sick.com

Bus-enabled

First packaging machine with information sensors

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For volumes and ID

"Package solution" for the Johannesburg superhub

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Format adjustment

Positioning drive for rapid product changes

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600 pages on safety

Industrial Safety Systems' Product and Services Catalogue published

Page 43

INDUSTRIAL SENSORS
INDUSTRIAL SAFETY SYSTEMS
AUTO IDENT

HANNOVER MESSE
11. – 15. 04. 2005
Hall 9, Stand F 54

Connect 3:

secure your clear competitive advantages now – with the third generation of photoelectric switches from SICK!

Connect 3! This is the motto under which, at this year's Hannover Industrial Trade Fair, we are presenting our new generation of photoelectric switches – whose performance features far exceed those hitherto available! Regardless of their area of use, regardless of how high your demands may be: you can expect greater precision, greater reliability and the competitive advantages of an innovation that is unique – worldwide! Find out about them and visit us at the Hannover Trade Fair.

Advance information also available at www.sick.com/connect3

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SICK
Sensor Intelligence.

Quality and future-oriented investment

Dear Readers,

Have you ever been annoyed about a supposedly reasonably priced and integrated compact stereo system? When it becomes clear that the price of everything-from-a-single-source is unpredictable quality and ultimately the worst components dictate the tune?

It's no different in industrial automation. Here, too, the performance and future-orientation of your investment depends upon all the components being state-of-the-art and being co-ordinated to meet the particular requirements involved.

Which is why, under the heading "Independence", SICK places great worth on the products and solutions from our company not only being attuned to all common bus systems, but also being back-compatible – thus protecting your investment. So you profit doubly: with a guaranteed future for your investment, and with our technological lead that gives your plant that decisive extra harmony.

Our worldwide presence provides your investment protection: we have recently opened our own subsidiaries to represent us in Turkey, Russia, Slovenia and India. For you, our network of over 40 subsidiaries worldwide means that we can support you with the same services and the same solution expertise wherever you are.

Best wishes

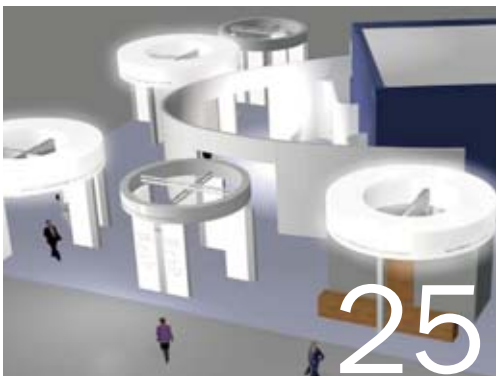
Anne-Kathrin Deutrich
Spokesperson, Executive Board
SICK AG

insight TELEGRAM

++ In 2005, SICK AG was again – as 2003 and 2004 – one of the ten most attractive employers in Germany – achieving position 10 overall and coming sixth in the category for companies with 501 to 5,000 employees – special "Lifelong Learning" award for comprehensive further education concept – www.greatplacetowork.de ++ New subsidiary in India – SICK Pvt. Ltd. started operations in New Delhi on 24 February 2005 – further locations are planned and should open in 2006 ++ Career Academy student Torsten Dages awarded VDI prize – Subject of thesis: "Creating software for the analysis, storage and visualisation of data from a Volume Measurement System" – Prize consists of 1,000 Euro and one year's free membership of VDI ++

Bus-enabled – the first packaging machine with information sensors

Blue sensors as “green fingers” in the greenhouse



Hanover Industrial Trade Fair 2005: *the* technology event

Maximum safety with more features

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Picture: AcuMine

No more nodding off! AcuMine mining transporters are now equipped with the HaulCheck warning system

Night-time safety

LMS – the sensor that prevents nodding off

In Australia, inventive engineers have come up with something to prevent accidents involving trucks, caused by their drivers nodding off. The HaulCheck warning system detects when a vehicle is about to leave its lane. On board: the Outdoor version of the LMS laser measurement system.

The sleep warning system has been developed for mining transporters that can weigh up to 290 tonnes. If such a monster deviates from its lane it poses a considerable risk for its driver, the vehicle with its load, and any other traffic that may be present in the vicinity. Investigations of some of the most recent accidents have clearly pinpointed the main cause: drivers taking a brief catnap, exhausted by the hard work.

An electronic "wake-up call"

Now there's no more snoozing. As soon as the LMS, measuring the distance to the posts alongside the lane, detects that the vehicle is getting too close to them, the HaulCheck system in the driver's cabin gives out powerful optical and acoustic alarms. Simultaneously, other vehicles in the area are warned via radio and GPS.

Also assists alert drivers

HaulCheck, however, is not just an electronic alarm clock, but also an intelligent assistant. Thus the system detects the posts, arranged in a special geometry, and informs the driver that he or she will soon reach a crossroads, a dangerous stretch of road, or a loading or unloading area.

HaulCheck and LMS – wide awake day and night. **INFO 101**

www.acumine.com

Trade fairs in April with SICK

HMI Industrial Trade Fair in Hanover from 11 to 15 April
Hall 9 – Stand F54
www.hannovermesse.de

SEMICON Europa in Munich from 12 to 14 April
Hall B2 – Stand 170
www.semi.org

interpack in Düsseldorf from 21 to 27 April
Hall 13 – Stand C60
www.interpack.com

Control in Sinsheim from 26 to 29 April
Hall 7 – Stand 7040
www.control-messe.de

Software for risk analysis offers further developments in a double pack

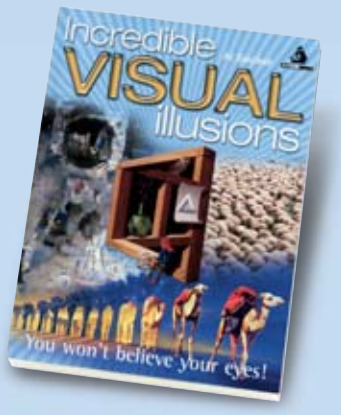
EN ISO 12100 standards and the Check and Acceptance Assistant are integrated

Version 4.2 of Safexpert, the network-enabled CE software for uniform safety considerations of machines and plant, offers two important further developments: the conformity process in line with the "new" (EN ISO 12100) and "old" (EN 292) standards, and the "Check and Acceptance Assistant".

Safexpert 4.2 thus also offers a smooth transition of the CE conformity process to the new EN ISO 12100 and a new service: uniform safety and quality examinations/acceptance of machines with just one tool.

Interested? The complete article is available at: **www.safexpert.de**

insight**BOOK CORNER**



Incredible visual illusions

You don't believe in optical illusions? See for yourself – you won't believe your eyes on page 46.

Meurer presents the first packaging machine with information sensors

Standard sensors now bus-enabled!

Sensors with fieldbus capability - the WT 18-3 photoelectric proximity switch with special chip technology and a fieldbus connection module

Meurer Verpackungssysteme is presenting the first packaging machine with fieldbus-enabled WT 18-3 series photoelectric proximity switches at Interpack 2005. Remote requests and remote adjustment, the exchange of parameters, the monitoring of contamination, and the identification of interfering signals – all this has been made possible by two-directional fieldbus communication between the sensors and the control system.

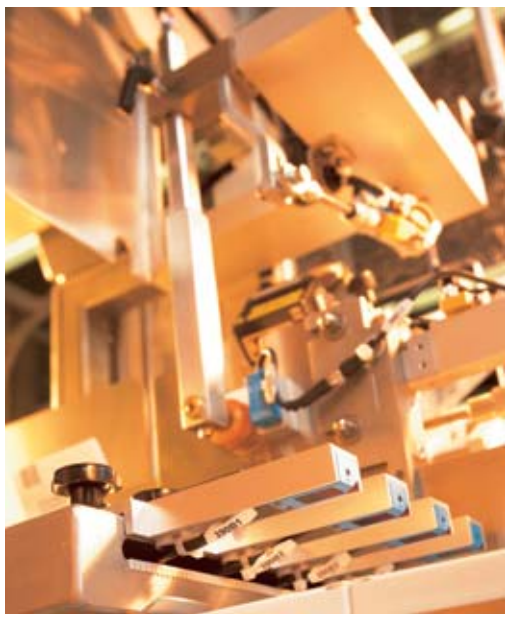
>> "In the case of packaging machines for the food or pharmaceutical industries, in particular, the WT 18-3 information sensor opens up completely new opportunities regarding validation", says Ludger Richter, Meurer's Sales Manager. "Sensor adjustment is no longer described in written form but stored as a reproducible parameter set in the machine control system itself, and is called up from there when necessary via the Sensor Hub – a fieldbus connection module", explains Walter Schmidt, the Works Manager.

Complete information to and from the sensor

The sensor owes its fieldbus capability to a chip technology specially developed for photoelectric proximity switches, and to the Sensor Hub. The new chip consists of a receiver with 16 elements with a programmable virtual separating seam for the electronic adjustment of background blanking. Not only are the scanning distance and scanning range of the WT 18-3 now more rapidly, more precisely and more application-specifically definable, but also highly reproducible. The fully electronic sensor concept is a prerequisite for two-directional communication – the Sensor Hub, to which up to four WT 18-3 units can be connected via an unshielded 4-pin standard cable, provides the physical basis. In this way the sensors can be visualised and contacted, as fieldbus participants with distinct addresses, from the machine control panel as well as from a distant control room, and the particular settings and state data called up," says Walter Schmidt.

For intelligent and compact packaging machines

The new sensor technology allows considerable improvement in the design and operation of packaging machines. "Because remote settings can be made, and the sensors no longer need to be accessible, they can now be integrated in the machine at optimum loca-



Difficult to reach but easy to operate – sensors in a Meurer packaging machine

: TITLE TOPIC

(Left to right) Wilhelm Schürmann from SICK, Walter Schmidt and Ludger Richter from Meurer

tions for the process, despite limited space, and still be well-protected against environmental conditions," says Ludger Richter. Whether device exchange, changes in format, or sensors employed in parallel – whatever the case, parameters are no longer set or altered manually, but are downloaded from the machine controller. Moreover, calling up status information, for example on the actual signal quality, allows any problems to be dealt with in good time during planned machine downtimes.

On the way to standard technology

Sensors with the new chip technology are well on the way to becoming the new standard in automation technology. This is not solely because of the technological aspects, but also for reasons of operational practice. On the one hand, the device is downwardly compatible, i.e. can be replaced by any conventional sensor when necessary, e.g. the WT 18-2 predecessor series – minimising machine downtimes if there is a problem. On the other hand, the entire sensor and Sensor Hub concept can be retrofitted in existing machines with a fieldbus infrastructure.

Further "information sensors" are already available, e.g. for detecting small parts in the electronics industry, or objects on conveyors in transport and warehousing systems – see also page 12.

insight*LINK*

You can obtain further product information with the attached card under:
INFO 102
or on the Internet at:
www.sick.de/insight/en
More about the customer:
www.meurer-gruppe.de

More on LMS navigation

The way is clear for mobile security robots

The MG 400 is the name of an autonomous security robot for detecting hazards and persons. The LMS laser measurement system provides the necessary mobility.

>> The rolling security guard was developed by the Neobotix Department at GPS GmbH. Its purpose: monitoring buildings and open spaces such as warehouses, company grounds, production plants, office blocks, shopping malls, museums or trade fairs.

LMS navigation is that extra something special

Ultrasonic sensors, radar sensors, CCD and heat-imaging cameras with integrated web servers, swivelling sensor heads and intelligent software are all very well, and undoubtedly necessary for security purposes – but the extra something special of the MG 400 is its navigation concept. It is based on the highly precise LMS that provides the automatic, accurate and almost drift-free navigation of the small robot. It is thus just as mobile as a real security guard: it can go on patrol autonomously, cover fixed routes at particular times, as well as carry out random checks or observe what's going on in its vicinity from a fixed location.

Thus the ever-alert MG 400 offers numerous new security opportunities.

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INFO 103
or on the Internet at:
www.sick.de/insight/en
More about the customer:
www.neobotix.de

The autonomous MG 400 security robot - mobility provided by the LMS laser measurement system

Picture: Neobotix

Laser measurement system improves intra-logistics at Porsche

Two LMS laser measurement systems allow fully automatic de-piling of numerous different load-carrier variants in a new depalletising system at Porsche AG in Stuttgart-Zuffenhausen.

>> The two-lane depalletising system with the LMS for optical contour detection was constructed by general contractor Aberle Steuerungstechnik GmbH from Leingarten. This new plant has increased transport volumes, from the central incoming goods area to the high-bay warehouse that supplies production, to 2,000 pallets per day.

New material flow for the new 911 series

The reorganisation and modernisation of the intra-logistics became necessary because of the parallel production phases of two vehicle types. "The conveyor system that transports the pallets from the central incoming goods area to the transfer zone of the high-bay warehouse for storage plays a decisive role in this", explains engineer Kai Maring, the responsible Project Manager at Porsche. "Goods destined for production spend an average of just 2.1 days in the warehouse, often even less. It was only possible to guarantee continuous supply to the warehouse (and thus to production) by increasing conveyor performance. This, in turn, required an automatic de-piling of the stacks of pallets that can reach heights of up to 3 m." The solution from Aberle: a two-lane depalletising system that removes the individual load carriers from below. One LMS laser measurement system from SICK is used per lane for determining the position of pallets and for checking the height of the particular pile of pallets.

LMS: one system for different load carriers

The contour and position of numerous different load carriers had to be taught-in to the LMS units at Porsche. The only thing that they have in common is the pallet foot (standardised in line with DIN 15155) which is detected and checked by the particular LMS. Potential interfering factors such as a dirty foot or pallets piled up misaligned have no effect on the measurement. The piles of pallets to be stored reach the depalletiser in a random order and with an arbitrary pile shape. The position tolerance is checked after the contour of the pallet foot is detected. If an In Order signal is generated, the LMS travels upwards to check the height of the pile. Then the stack is lifted, and the lowest pallet is removed by a chain conveyor and transported towards the high-bay warehouse. The pile of pallets is lowered again, the position of the new lowest pallet is checked and the height of the remaining stack of pallets is re-determined. When the last pallet has been reached and transported out of the depalletiser the next pile of pallets can be transported in.

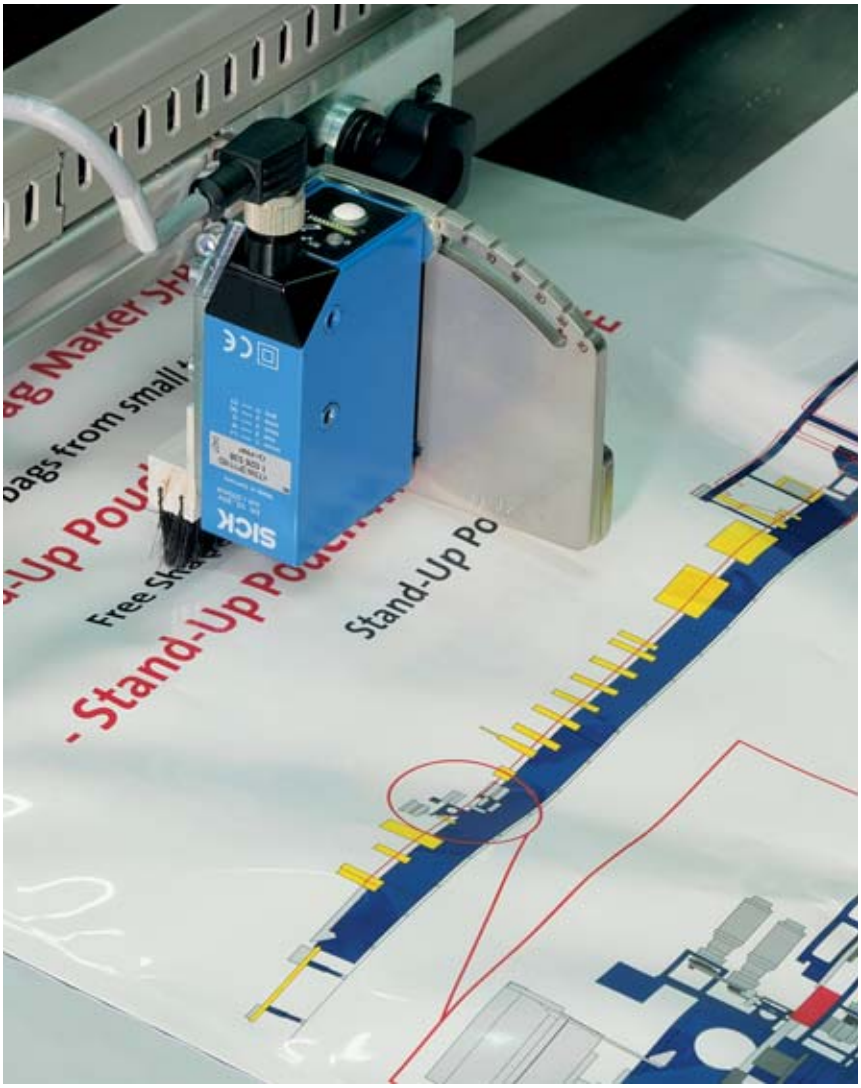
Leipzig also profits from the Zuffenhäuser solution

"The entire plant has demonstrated very high availability since production started in January 2004", Kai Maring comes to a positive conclusion. This is not only of benefit to the Boxster and Porsche 911s produced at the main works in Stuttgart, but also advantageous for the vehicles of the Cayenne series and the Carrera GT super sports car assembled in Leipzig, because their engines are also "made in Zuffenhausen".

insightLINK

You can obtain further product information on the Internet at:
www.sick.de/insight/en
More about the customer:
www.porsche.com
www.a-s.de

One LMS laser measurement system is in use on each lane of the two-lane depalletising system



Reliable print mark detection with the KT 5 Display contrast scanner in B & B's foil bagging machine

Teach in, tune up, scan

Better packaging with the Display contrast scanner

B & B Verpackungstechnik GmbH in Hopsten relies on the KT 5 Display contrast scanner for the detection of print or control marks in their foil bagging machines. The reason: the device offers maximum detection reliability, and thus machine availability, as a result of its ease-of-use, its operational reliability and its automatic adaptation to shininess.

>> New packaging materials, new colour designs and the ever-growing range of products make great demands of powerful packaging machines – and their sensors. Whereby the reliability of a contrast scanner, for example, not only depends on its optical and evaluation capabilities, but also on reliable adjustability.

Ease-of-use means operating reliability

The KT 5 Display is based upon the tried-and-tested device concept involving a three-colour transmitter LED, 10 kHz switching frequency and two-point teach-in. With its bar display and digital signal tuning on the device, the scanner sets a new standard regarding ease-of-use and switching reliability. Simple operation plays a very important role. Teach-in of the switching threshold takes place via two-point teach-in (on the mark and on the background) directly on the device itself. Then the sensor autonomously activates the optimum transmission colour (red, green, or blue) of the three-colour LED. The current reflectivity of the target object and the switching threshold set by the device are shown on the display. If required, it is possible to carry out highly accurate manual fine adjustment of the switching threshold via the tuning button. After teach-in, the bar display visualises the quality of the current contrast and thus detection reliability.

The advantages convince its users

B & B Verpackungstechnik particularly appreciates these advantages. The medium-sized mechanical engineering company has been active in the construction and manufacture of machines for flexible packaging, e.g. watertight bags, paper bags, industrial sacks, and bags for vacuum cleaners, for over 25 years. With the KT 5 Display, B & B now use a contrast scanner for print mark detection that also reliably detects low contrasts on highly reflective foils, as the sensor's automatic shininess adaptation adjusts optimally to the target object. The sensor's switching signal is used to control the pulsed web transport. If necessary, the machine operator can even optimise the switching threshold via the tuning button while the machine is running.

B & B can now process bag materials of every colour and surface type even more reliably with the KT 5 Display – even on the most rapid machines, with web speeds of up to 3 m/s.

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INFO 104
or on the Internet at:
www.sick.de/insight/en
More about the customer:
www.bub-hopsten.de

Not a flowery phantasy

Blue sensors as “green fingers” in the greenhouse

The Dutch company Hawe Systems Europe B.V specialises in producing flower and plant factories under glass. From seedlings to potted plants, SICK sensors are the “green fingers” within the sometimes highly complex transport and inspection systems.

A wide variety of SICK sensors are used in potted Gerbera *production*

>> Hawe and SICK have been system partners for automation in the agricultural sector for many years. JHL Potplants’s potted *Gerbera* production facility in Pijnacker and Bunnik Plants’s five plant factories in Bleiswijk are among the most beautiful “offshoots” of this co-operation.

Bouquets of flowers are always in season

Bouquets are always welcome at christenings, at weddings, on Mother’s Day, on St. Valentine’s Day and for other celebrations. “It is therefore not enough to simply grow plants under glass all year round. Production from seedlings to saleable plants is a complex process that must be sufficiently automated to be able to efficiently meet customer demand from January to December”, says Hans Lekkerkerk Senior of JHL Potplants. And he ought to know – every day about 30,000 potted *Gerbera* plants leave his production site, designed and constructed by Hawe – with wide-ranging use of SICK sensors.

Apart from green fingers, the automation of transport and inspection processes also plays a decisive role in Bunnik Plants’s five works. The company delivers 300,000 trend-oriented and seasonal plants every day. “Our customers include small and medium-sized businesses, as well as large companies such as Ikea, Aldi or Lidl”, Frans Bunnik describes the demanding clientele, who place particular value on top quality at precisely calculated prices. “Efficiency under glass – that’s what matters.”

Growth-oriented transport systems

Hawe is well aware of all this. The company’s expertise in automation in the agricultural sector is amply demonstrated in the design of the transport systems, among other things, at both JHL Potplants and Bunnik Plants. “The plants are very close to one another during the potting phase”, explains Erik Vermeijden from Hawe. “They are given more room as they grow – particularly on the transport systems. Here, they automatically move between the individual processing stations as they near the final sorting and packaging stations.” The sensors each fulfil differing tasks depending on the application. User-friendly plug & play miniature sensors of the W 100 and W 140 series detect individual plants and plant pots on the fixed transportation systems. The automated guided vehicles moving between the various greenhouse departments are protected with laser scanners. “The devices are particularly agriculture-friendly”, reports Erik Vermeijden. “They function equally well under bright sunlight or in fog, and are not phased by the bees or birds present in the greenhouses. Vehicles for driving outdoors are equipped with heated and waterproof scanners.”

»Efficiency under glass – that’s what matters.«

Blooming in business – business is blooming

Ultimately, size and the flowering state determine whether, for example, a pot-

MLG light grids assess plant height and flowering

Transport vehicles with laser scanners suitable for agricultural use

ted *Gerbera* is ready for despatch. MLG light grids measure the height of each plant and determine whether it is flowering – because the flowering of plants can vary by up to three weeks within a single batch, depending on whether they flower early or late. "What is unique about the inspection process is that the sensor can distinguish between a pot and overhanging leaves", says Erik Vermeijden. Thus only plants that are actually flowering are delivered to retailers – ensuring that they enjoy a blooming business.

insight**LINK**

You can obtain further product information on the Internet at:
www.sick.de/insight/en
More about the customer:
www.hawe.nl

Improved package identification in Pilsen

Technology update at Czech Post

Packages leaving the post distribution centre in Pilsen have been arriving punctually again since November 2004. This is thanks to the OPS 690 omniportal reading system from SICK which improves high-speed identification reliability and sorting rates for packages of all sizes.

>> The technology update was necessary because the system previously used could no longer keep up with the steadily increasing throughput rate of the tipping tray sorter at the distribution centre.

Top solution for top reading

An OPS 690 omniportal reading system with six CLV 490 bar-code scanners, which transmit their data to the OPS control unit, was installed. The devices are mounted in pairs perpendicular to one another. As a result, the OPS generates three optical reading crosses on the sorter with differing depths of field. This allows straightforward identification of packages with heights of between 15 mm and 500 mm. Moreover, the evaluation algorithms of the bar-code readers also permit the reading of bar codes behind a foil or in an envelope "window". The bar codes themselves are 13- or 18-digit Code 128 some of which have bars just 0.25 mm wide, that must be read at speeds of up to 1.4 m/s. Provision of the reading data to the plant control system takes place via an RS-422 interface, that feeds the information into the sorter controller online.

Modular concept better

Unlike the old system, the Czech Post in Pilsen deliberately chose the modular system concept of the OPS 690, as the bar-code readers are industry-tested serial products and device updates, or the exchange of individual scanners, can be carried out rapidly and without interruption of the sorting plant.

Word of the new sorting power in Pilsen has got around the other Czech Post centres. Here, too, in the foreseeable future the post should really "take off" again thanks to the OPS.

insight**LINK**

You can obtain further product information with the attached card under:
INFO 105
or on the Internet at:
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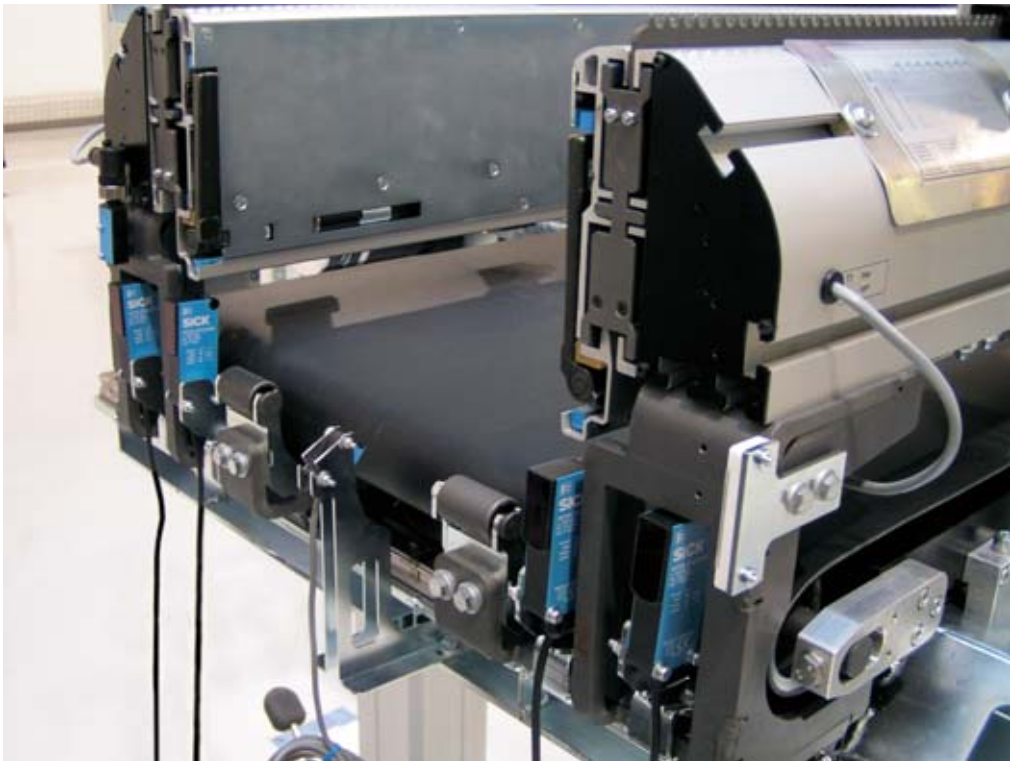
The OPS 690 identifies packages with heights of between 15 mm and 500 mm



The Twister VC telescopic gripper: a load-carrying system for automatic high-bay stackers for the direct double-depth storage of cartons weighting up to 50 kg
Top right: Thomas Damberger and Roland Hackenjos from SICK, Josef Reischl and Michael Etlinger from TGW

When sensors suddenly see the warehouse differently

TGW: new scanner for new telescopic gripper

The Twister VC telescopic gripper developed by warehouse technology specialists TGW shows that an idea and its implementation can sometimes be two completely different matters altogether. It is often the case that the product innovation only actually becomes a practical solution when powerful components can be found – in this case a photoelectric proximity switch with new chip technology.

>> As a leading producer of automated material flow and warehouse technology, TGW Transportgeräte GmbH & Co. KG. in Wels, Austria is a supplier of intra-logistical solutions active worldwide. "We are actually the market leader in Europe for small-part storage technology up to 250 kg load capacities," says Michael Etlinger from the Marketing Department at TGW. But having a lead in experience and technology does not always prevent surprises from cropping up in projects or during product development, e.g. for the new Twister VC telescopic gripper.

Double-depth direct storage

This is a newly developed load-carrying system for automatic high-bay stackers for the direct double-depth storage of cartons and containers weighing up to 50 kg. "As a result of its high acceleration and speed values, compact design and the possibility of double-depth storage, the load-carrying equipment has a very high device performance potential," Josef Reischl, from TGW's Innovation Management Department, quotes the most important advantages of the Twister VC. During the initial project, however, there was an unexpected, because previously unknown, problem: the sensor.

New way of looking

Because, like the Twister VC itself, the method of checking available storage bay space was also new. No longer would the cartons be detected, but the (considerably larger) free light path to the left and right of them. The task of the sensors: to transmit an In Order signal if the light path is free and to stop the handling process on reception of a reflection. "But suddenly we were getting inexplicable fault messages despite the correct positioning of the cartons in the storage bay," Josef Reischl remembers. "We also had to learn to see the steel structure of the shelves with new eyes. Different suppliers design the shelving differently, e.g. one might use galvanised steel and another powder-coated metal. In the ware-

house, this leads to the most varied of reflections that are totally randomly detected by sensors – and this fools the system into perceiving the presence of a carton in the light path." It is thus a challenge that requires a new type of problem-solving – the WT 18-3 photoelectric proximity switch.

New type of sensor concept as "shining" solution

The increase in passive sources of interference in the areas of use of optoelectronic sensors observed in recent years (caused by mobile phones, radio devices, light sources, drives, highly reflective surfaces, or other sensors, etc.) has fundamentally influenced the development of the WT 18-3. It is the first device of its type with chip technology specially developed for scanners with background suppression. "The new WT 18-3 has a scanning distance and scanning area that can not only be defined more quickly, more precisely and more application-specifically, but also have a high level of reproducibility," confirms Josef Reischl. Passive interference of all types in the area of operation, e.g. highly reflective metal parts, are electronically suppressed and thus reliably cut out.

Unique: a "sensor's-eye" view of the warehouse

"And," adds Josef Reischl, "with the WT 18-3 the days of iterative, time-consuming searching for the optimum sensor adjustment are over." With the WT 18-3 one can now gain a "sensor's-eye" view of the warehouse. "With the help of appropriate visualisation software, the sensor's light reception can be displayed both during test commissioning at the works and in-situ at the plant, the light reception can be assigned to the target objects or the environment, and adaptations of the sensor settings can be carried out online. So compared to the difficulty of adapting classical opto-sensors one saves a great deal of time in each project," Josef Reischl praises the practical advantages of the new scanner.

The subjects of reflections and background suppression while monitoring available space have now been sorted out at TGW, as the sensor has become a firm component on the Twister's bill of materials.

insight*LINK*

You can obtain further product information with the attached card under:
INFO 106
or on the Internet at:
www.sick.de/insight/en
More about the customer:
www.tgw.at

Vertical protection with the S 3000

No grounds for panic on the pallet paternoster

The S 3000 came at the right time for the Swedish paper factory Edet Bruk. An automatic pallet lift has recently been reliably protected with this safety laser scanner, still the only one approved for vertical protection.

>> The S 3000 not only monitors a preprogrammed protective field, it also constantly checks its reference contour. This contour would change if the device were misaligned during operation, and the S 3000 would stop the machine. This feature allowed the S 3000 to be certified for use in vertical applications – and used at Edet Bruk.

Top in tissue papers

100,000 tonnes of tissue papers are produced each year on three paper machines and processed to finished products on more than a dozen upgrading lines. This volume is equivalent to thousands of pallets laden with toilet paper or kitchen rolls, that leave the Production area annually and have to be transported by a pallet elevator to another floor for wrapping. Up to now, however, the elevator has proved resistant to automation – at least from a technical safety point of view. Too little space for light curtains, not to mention protective fences; the approved S 3000 solution came at just the right time.

Pallet yes, person no

The S 3000 was installed at a height of about 3 m directly on the frame of the pallet elevator. The floor of the hall serves as the reference contour. Two protective fields monitor the 1.3 x 3.3 m lift opening. When a pallet is loaded, the S 3000 detects the geometry that has been taught-in and allows transport into the elevator. A person – hardly likely to have the rectangular volume dimensions of a loaded pallet – would be reliably detected because their geometry deviates from that known to the scanner. The protective field is switched when a pallet is to be driven out of the paternoster so that movement in this direction is permitted.

High-tech from above – vertical monitoring with the S 3000.

INFO 107

Pepped up with AS-i

Sensor technology in automated herb garden

Experts in automated plant cultivation under glass are not only found in the Netherlands, but also in Denmark. The Legro Gartneri A/S in Karlslunde has "pepped up" the transport and packaging systems for their herbs and lettuces with AS-Interface, thus achieving more reasonably priced production.

Lower installation costs thanks to AS-Interface

The transport and packaging plant for herbs and lettuces

>> 15 million plants, of which far more than half are lettuces, are produced and despatched by the Legro Gartneri each year. The transport and packaging systems (and the photoelectric switches, safety sensors and bar-code readers in the automated herb gardens) meet the high technical and, thanks to AS-Interface, economic demands.

AS-Interface: cost advantages for coriander, chervil & Co.

Whether sowing machines, germination rooms, seedling care or the growth areas – herb and lettuce cultivation is largely automated. This is now also the case for packaging, palletising and despatch. These areas have been redesigned and, in addition to the sensors themselves, equipped with AS-Interface Standard and AS-Interface Safety at Work components from SICK. "The decision to employ AS-Interface was easy because the automation systems, as well as the safety equipment, could be controlled via a bus infrastructure", says Carsten Schmitt from the external servicing and maintenance service providers Solrod El-forretning. "This brought about far more convenient installation and quicker commissioning, and thus led to considerable cost benefits for herb production."

From the growing area to the despatch area

After the herbs and salad plants have been matured to saleable size in the growth area they are identified with the help of the bar codes on their pots, packed in pre-printed plastic bags, and inserted into a tray. The trays are placed in boxes in the packaging machines. The bar code on the box is, in turn, read by CLV 421 scanners and the information is used by the conveyor system control to transport it towards the automatic palletiser. Its operating area is partly surrounded by a protective fence whose access doors are equipped with SICK safety switches. The sides that are not fenced in are monitored by MSL multi-beam photoelectric safety switches. All sensors are in an AS-Interface network. "AS-Interface Standard and Safety at Work modules, one safety monitor, and several Profibus gateways ensure a smooth control process," says Carsten Schmidt.

Fewer cables and lower costs – advantages given a green light at Legro thanks to AS-Interface.

insight**LINK**

You can obtain further product information on the Internet at:
www.sick.de/insight/en
More about the customer:
www.legro.dk

The number of LMS units installed on the lane-spanning gantry depends on the width of the lane

Electronic truck classification: making toll evasion tough

In the distance-based motorway toll system for trucks, introduced this year in Germany, laser measurement systems ensure reliable, invoice-oriented detection of all vehicles with a load capacity over 12 tonnes.

>> In order to prevent toll evasion, the TollChecker stationary checking system from Vitronic, in Wiesbaden, among other systems, checks whether passing vehicles are trucks that should pay the toll fee. Detection takes place in moving traffic – and with the LMS laser measurement system from SICK.

Lane width determines structure of the checking system

Several LMS units, depending on the width of the lane covered, are installed on a gantry that spans the lane. Evaluation of the measured data generates large amounts of information that clearly classify the vehicles, e.g. length, width and the height of trucks and trailers, and provide a characteristic profile of the vehicle.

Active in all weathers

The LMS is available whatever the weather thanks to its outdoor housing, its scanning process that is independent of brightness and surface, and its software algorithms for cutting out interference. If a toll-relevant vehicle is detected, its image is acquired three-dimensionally in combination with other sensors in a special process. This image is so detailed that the weight class, the number of axles, the vehicle type, etc. can be determined from it. Simultaneously, Vitronic cameras record the number plate and other details.

Great accuracy

Whether at 30 km/h, 80 km/h or at higher speeds – the laser measurement systems provide precise results. Potential measurement errors amount to less than 150 mm for the width, and only 100 mm for heights.

insight*LINK*

You can obtain further product information with the attached card under:
INFO 108
or on the Internet at:
www.sick.de/insight/en
More about the customer:
www.vitronic.de

The LMS Outdoor - can be used in all weathers

All vehicle profiles can be unambiguously classified

Automatic unloading of coils at Novelis Deutschland

Visual crane guidance with laser measurement system

picture: LASE

The warehouse for incoming coils with its fully automatic handling system

The gantry crane at Novelis Deutschland GmbH in Nachterstedt unloads railway wagons coil-by-coil – entirely automatically. This has been made possible by a laser measurement system from LASE Industrielle Lasertechnik GmbH. The SICK IBEO laser scanner used in the system makes the coils on the wagons visible for the crane controller.

>> LASE, with sites in Wesel and Bremen, is a specialist in the industrial use of laser systems in the steel industry, among others. Its many years of technological expertise were just what those responsible at Novelis Deutschland's works in Nachterstedt needed, as it was necessary to create a completely automatic handling system for unloading coils using an existing, largely automated, crane at the coil warehouse.

Novelis – aluminium for automobile construction

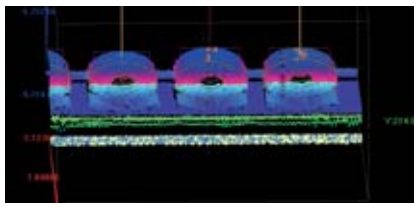
Novelis is Europe's leading supplier of aluminium sheet, and its Automotive Division is an innovative and competent partner of automobile manufacturers and their suppliers. At the heart of the Nachterstedt production site is the continuous throughput annealing and spraying plant with a capacity of approx. 100,000 tonnes per year. Strips with thicknesses of 0.6 to 3.0 mm and widths of up to 2,200 mm (dimensions of relevance in bodywork applications) are soft-annealed or solution annealed, cleaned, pre-treated and coated in this plant. The strips are then accurately prepared for use on cut-to-width and cut-to-length lines.

It was necessary to automate both the unloading of the coils from the railway wagons and their storage at the incoming coil warehouse, which supplies the production process. In August 2004, LASE supplied a laser measurement system for determining the position of the coils on the wagons. MSR-Service GmbH from Grossörner handled implementation of the laser system and coupling of the laser measurement system to the controller and process management system.

The LD OEM laser scanner

Long range, high resolution

The LD OEM laser scanner used in the LASE measurement system operates with a pulse frequency of 14.4 kHz and produces a laser impulse (i.e. a measurement value) every 0.25°. Data preparation in the scanner takes place in an application-specifically programmable digital signal processor specially integrated in the device. Data is then directly transmitted from the scanner to the system's LASE measurement PC.



A 3-D image of the loaded wagons

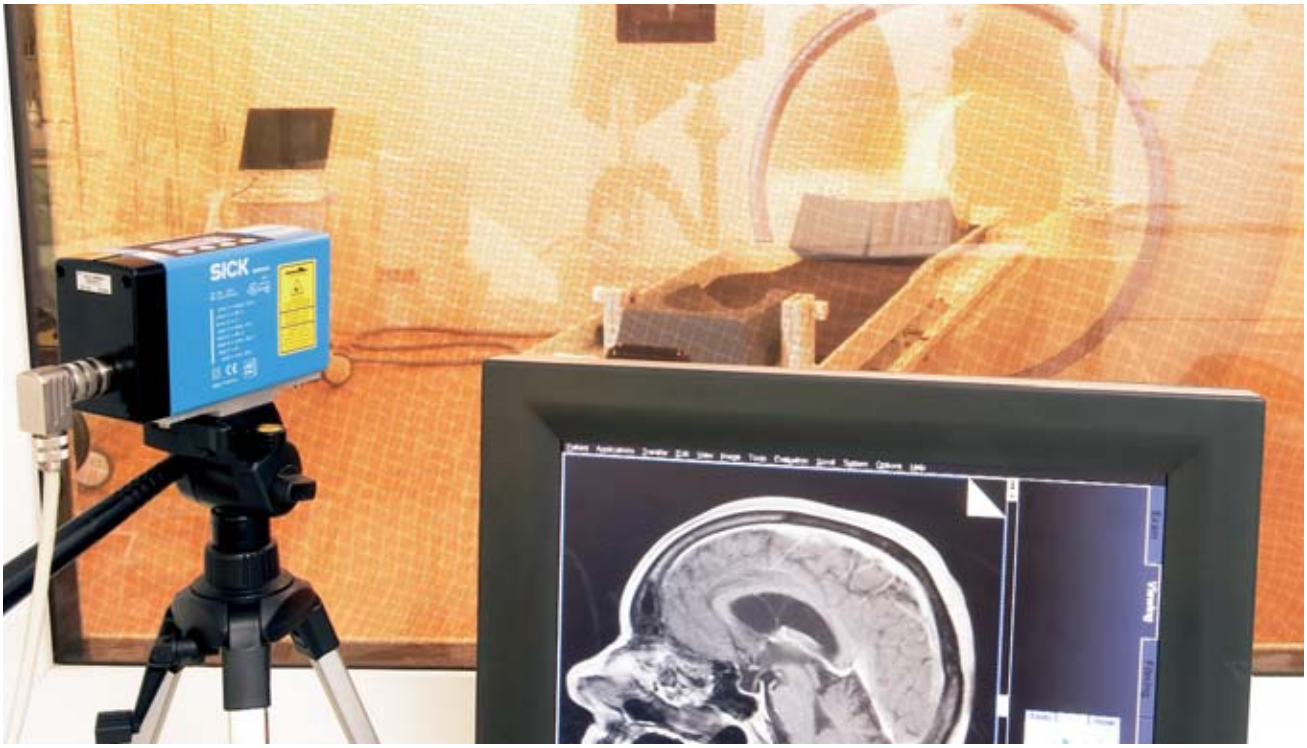
One-by-one off the wagon

The incoming warehouse, fronted by the roughly 150-metre-long platform, has an area of 25 x 200 m². The laser scanner was installed on the crane at a distance of 4 m from the centre of the platform, providing an uninterrupted view of the wagons. Before autonomous coil unloading begins, the crane passes over the entire row of wagons alongside the hall platform at constant speed for measurement. During passage, a laser distance measuring device detects all the crane positions (x-axis) and transmits them to the measurement PC. At the same time the LD OEM detects the lateral position (y-axis) and the coil height (z-axis). The laser measurement system generates a 3-D image of the loaded wagons from this data and transmits the positional data required for each coil to the crane PLC. From here the data is transferred to the warehouse administration system which then generates the drive orders for the automatic crane.

Now automatic unloading can begin – one-by-one off the wagon.

insight*LINK*

You can obtain further product information with the attached card under:
INFO 109
or on the Internet at:
www.sick.de/insight/en
www.novelis-nachterstedt.de
www.lase.de *and* **www.msr-online.de**



The rolling table platform for patients in MRI scanners - correctly positioned with the DME 5000

Laser distance measurement in medical technology

Position detection in MRI scanners

The great accuracy of the DME 5000 laser distance measuring device is also finding new applications beyond the industrial sector, e.g. in medical technology. Such a system is now being used for positioning the rolling table platform for patients in a magnetic resonance imaging (MRI) scanner at the Radiology Department of the University Clinic in Essen. The result: highly precise whole-body angiograms without overlapping or gaps.

>> This solution is based on the AngioSURF rolling table platform for patients made by MR-Innovation GmbH in Essen. The company researches and develops new techniques, imaging strategies and applications for magnetic resonance tomography (MRT).

Seamless display of the body

AngioSURF is a manually moved table platform that can be installed on the original patient table in SIEMENS MR tomographs. This allows whole-body MRT examinations in several wards with the good imaging quality provided by surface reception coils. In a new process, the patient is no longer passed through the tomograph bit-by-bit but continuously. The new method eliminates artefacts between partial images. In this way radiologists obtain a seamless image of anatomies extended as required, considerably simplifying diagnosis. However, an exact positioning or forward feed detection is necessary so that different passage speeds cannot lead to spurious or stretched images during image reconstruction.

The DME 5000 for undistorted MR angiograms

With an accuracy of greater than 0.5 mm and highly dynamic control behaviour – a new measurement value is generated every millisecond – it provides continuous information on the actual position of the table platform. The speed of movement is displayed for the MRT operator. The particular positional values are transmitted in real time and continuously taken into account during evaluation of the individual MRT measurements. “Non-linear behaviour of the platform doesn’t cause any distortion within the individual measurement segments”, explains engineer Michael Zenge of the Biomedical Imaging Section at the University Clinic in Essen. “The individual measurement intervals of the MRT are evaluated equidistantly and combined to form segments, and then finally to form a high-resolution whole-body angiogram.”

Ultimately, it is the position data of the DME 5000 that permits highly accurate seamless whole-body MR imaging with maximum image quality through the use of surface coils.

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INFO 110
or on the Internet at:
www.sick.de/insight/en
More about the customer:
www.uni-essen.de/radiologie

For volumes and ID

“Package solution” for the Johannesb

The Courier & Freight Group, a subsidiary of South African Post, has equipped the Johannesburg superhub of its XPS express package service with a fully automatic data acquisition solution from Caljan Rite-Hite (CRH) to increase package-processing productivity. The VMS 420 volume measurement system from SICK is responsible for determining dimensions in this “package solution”.

For courier, express and package logistics

PTB certifies volume measurement system

The Federal Institute of Physics and Technology (PTB) in Braunschweig has certified the VMS 520 volume measurement system on the basis of the test parameters of the OIML R129 standard. A complete system capable of calibration can now be developed for courier, express and package logistics – and approved by national testing authorities – by combining a calibrated weighing system with bar-code scanners.

>> **Continued page 30**

>> Improved performance capability at the superhub, however, does not just result from optimised processes, but also from the possibility of invoicing each customer for the actual package numbers and volumes transported.

Actual performance has become measurable

This so-called revenue recovery, i.e. the possibility of being able to issue follow-up invoices for the actual performance carried out, is just one of the arguments with which Noko Ngoepe, responsible for IT at the Courier & Freight Group (CFG), justifies investing in the systems supplied by the Danish system integrator CRH: “There are also the improved sorting, preparation and distribution processes at the superhub, as well as enhanced process reliability. All packages have a unique identity as a result of their bar code, their weight and their dimensions, so that they can be both controlled and tracked.” With the data acquisition solution that has been installed at the XPS superhub, i.e. with the volume measurement system from SICK integrated within it, each of the several thousand packages handled daily can be measured accurately to within a few millimetres. As a result, CFG can not only optimise loading space and transport capacities, but also issue realistic invoices due to complete and accurate dimensioning of the actual goods transported. “At the same time, billing for the service that we provide is more precise – which also benefits our customers”, says Noko Ngoepe.

The VMS 420 volume measurement system – at the heart of complete solutions

The complete solutions commissioned at the Johannesburg superhub on 2 September 2004 were developed by the Danish company Caljan Rite-Hite. “By integrating a bar-code reader, a weighing system and the VMS 420 volume measurement system we have developed a complete turn-key system for courier, express, and package services, with which all transport-relevant information on the individual packages is

urg superhub

determined and evaluated as actual data ", comments Stein Schierenbeck of Caljan Rite-Hite. "As the VMS 420 is characterised by compact dimensions, the integration of numerous functions, and simple installation and commissioning, we could optimally combine it with the other identification modules", Stein Schierenbeck cites further advantages.

Legal-for-trade version provides certified accuracy

The VMS 420 volume measurement system installed at XPS already allows packages to be measured accurately to within a few millimetres. The VMS 520 is available for those tasks in which "calibrated accuracy" is required (see below left).

Left: The VMS 420 detects package sizes
Top: The superhub with a fully automatic data acquisition solution

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INFO 111
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www.sick.de/insight/en

Improved climate for happier cows

Ultrasonics in the cow-shed – soon everywhere?

Healthy cows are happy cows that produce more milk. But in some cowsheds heat or high air humidity prevent milk cows enjoying feelings of happiness. So at Bavaria's state Agricultural Institute the lying behaviour of cows in the shed was recorded with ultrasonic sensors as a measure of creature comfort.

>> Lying behaviour, and the frequenting of particular lying stalls in the pen, provide important information on the wellbeing of milk cows. But when does the cow feel really good? When does the shed need airing? When are which window areas to be shaded? What is the relationship between the shed climate and the weather outside? All questions to which the cows provide direct answers – with their lying behaviour. Those who know the conditions affecting this application also know that the sensors' extremely precise temperature compensation is of great significance – for it is only in this way that the lying behaviour can be accurately determined in the heavily fluctuating temperatures in the cowshed.

Adjusted to the cow's skin …

… the ultrasonic sensors from SICK are installed above the lying stalls. They were taught-in on two distances by staff at the Institute for Agricultural Engineering, Construction and Environmental Technology at Bavaria's Agricultural Institute. In this way it is possible to determine whether a cow is standing, lying, or whether the pen is empty and the animal feels better elsewhere. Now the scientists only need to compare the collected weather and stall climate data with the lying behaviour and it becomes clear when the cows feel best, and how this comfortable climate is to be achieved.

If they succeed in offering cows an optimum stall climate on the basis of their lying behaviour there will soon be ultrasonics in every cowshed.

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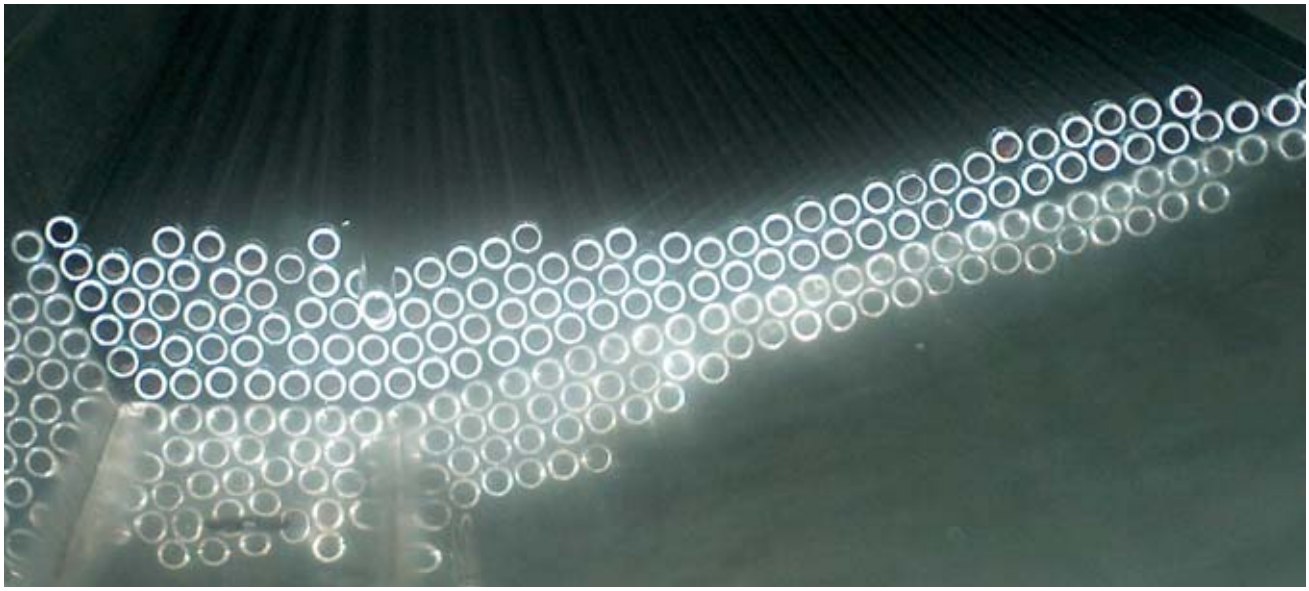
INFO 112
or on the Internet at:
www.sick.de/insight/en
More about the customer:
www.LfL.bayern.de

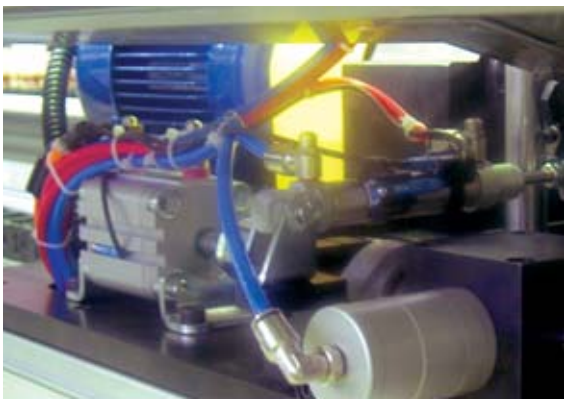


Pictures: ISKRA ZMiLS

Metal pipes for vehicle parts at TI Automotive

Position determination at Polish machine constructor

Magnetic and inductive sensors in grinding machines



Monitoring the pistons of differing pneumatic cylinders with RZT 6 magnetic cylinder sensors

Quality and dependability are particularly important for the internationally active automobile supplier TI Automotive. Which is why they selected the new milling and grinding machines from ISKRA ZMiLS – with position detection sensors from SICK.

>> The Polish machine producer ISKRA ZMiLS specialises in the production of special bearings, as well as the manufacture, overhauling and modernisation of milling and grinding machines. The machines newly developed for TI Automotive employ both RZT 6 magnetic cylinder sensors and IM 18 series inductive sensors.

Precision through perfect position determination

The TI machines' tasks are to accept metal pipes for vehicle parts from a feed system, check their lengths and, if necessary, process them mechanically before passing them on to a further transport system. The RZT 6 sensors monitor the position of the pistons in the various pneumatic cylinders used in the machines during length inspections and processing. The IM 18 sensors detect the absence or accumulation of pipes during insertion, in the processing area, and in the exit area of the machine. In addition to precise position detection, a high level of reliability is particularly important throughout the entire processing procedure. This is because of the short machine cycle (lasting only about five seconds) and the fact that several machines are operated by just a single person.

The sensors have made a positive impression at ISKRA ZMiLS – which is why they are also going to be used in the new series of machines for processing plastic vehicle components.

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INFO 113
or on the Internet at:
www.sick.de/insight/en
More about the customer:
www.tiauto.com
www.iskra-zmils.com.pl

Mobile decontamination system for task force vehicles

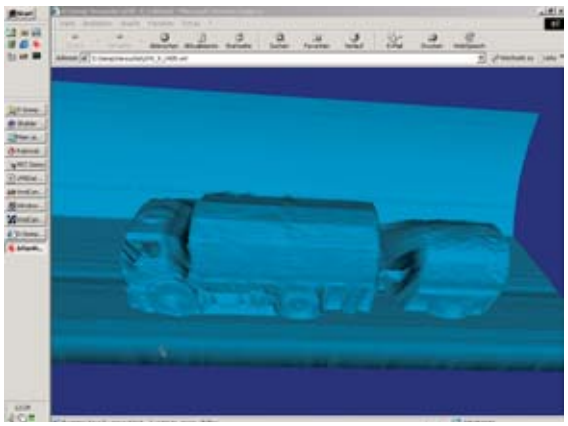
Laser measurement determines the washing programme

Alfred Kärcher GmbH & Co. in collaboration with the Fraunhofer Institute for Production Technology and Automation (IPA) have developed the mobile decontamination system Decont Jet 21 for the decontamination of task force vehicles. Two LMS 211 units installed on a cleaning gantry determine the contour of the particular vehicle. The system controller uses this contour to generate the movement data for the 9-axle robot arm.

>> Decontamination sounds like something military, like ABC weapons perhaps, though the reality is considerably closer to home. Whether foot and mouth disease, swine fever, fowl pest, SARS or avian 'flu – spreading the germs can have catastrophic consequences. The mobile cleaning and decontamination system Decont Jet 21 was developed in order to prevent the task force vehicles of the army, the THW (an organisation providing technical assistance in emergencies), or other aid organisations becoming unintentional carriers of viruses and bacteria.

On-site spraying, decontamination and detoxification

The entire mobile system weighs about 27 tonnes – it consists of a truck with a semi-trailer loaded with generator carriers, hydraulic systems, a 110 kW diesel generator, a hot-gas turbine, a 9-axle robot and a decontamination frame. Two men suffice to quickly set up the Decont Jet 21 for action. Before the decontamination process begins (first high-pressure cleaning, then hot gas decontamination with the exhaust jet of a 10,000 horsepower nozzle jet engine at temperatures of up to 450 °C), two Outdoor LMS 211 on the cleaning gantry determine whether the vehicle to be cleaned is a passenger vehicle, truck, trailer, tank, or another type of task force vehicle. They also detect whether aerials, wing mirrors or other mounted parts could interfere with the washing process. The control system determines a three-dimensional model of the vehicle that also takes into account the parking tolerances and any lateral or longitudinal slanting. This data is used to generate the necessary robot arm movement programme online – according to the cleaning steps involved in the washing programme.



Left: The Decont Jet 21 mobile system in action
Top: Three-dimensional measurement of a vehicle before cleaning

Flexible, maximum precision, ready for bad weather

The 2-D LMS 211 laser scanners traverse a measurement angle of 100° in 0.25° increments and achieve a measurement accuracy of about +/–10 mm at a frequency of approx. 20 scan profiles per second. Contour detection thus offers the possibility of precise three-dimensional measurement of even unusual and unknown vehicle contours (e.g. that of special task force vehicles) before the cleaning process and thus generates an accurate 3-D model of the vehicle – even in poor weather conditions. The Fraunhofer IPA developed special rain filters for the evaluation software to filter out the interfering measurements caused by heavy rain, and thus allow measurement to be carried out with the laser scanners despite poor conditions.

Pictures: Alfred Kärcher GmbH

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INFO 114
or on the Internet at:
www.sick.de/insight/en
More about the customer:
www.kaercher.de
www.ipa.fhg.de

For more efficient use of space and greater safety

Automatic counting of persons in public buildings

How many people are present at an airport or station? What is the flow of football fans like in the stadium? What is the relationship between the number of persons in shopping malls and the amount of sales or turnover? The LD PeCo People Counter system answers these and other questions. Whether children or adults, individuals or entire groups – the non-contact measurement system provides important information on building use and safety technology, among other things.

>> The LD PeCo was jointly developed by LASE Systemtechnik in Bremen and SICK IBEO in Hamburg. The system operates considerably more accurately than conventional counting solutions as a result of its measurement and evaluation possibilities – in use, for example, in the Kaiser Passage in Worms, in the Südring Centre in Berlin (by the Metro Group), in the Schloss Arcade shopping centre in Heidenheim.

What does such detection offer?

The evaluation of flows of persons (possible with path widths of up to 26 m) provides information on, for example, the best advertising areas in shopping malls or in public spaces. But air-conditioning equipment can also use this data as a control value to adapt current temperatures to the number of people present. And another very important aspect: the relationship between persons and existing safety

Reliable counting of persons thanks to 26 m range

measures such as escape routes can be continuously monitored and improved over the long term. Motto: measuring means monitoring. Monitoring means being able to introduce controlled measures if necessary.

Measurement with double curtain

The LD PeCo is an actively scanning, highly precise laser measurement system. The scanner emits two invisible, parallel, fan-shaped light impulses and measures the time to reception of their reflections. Regardless of the size and geometry of a space or a passage, the LD PeCo can be adapted to every room structure, e.g. columns or electronic goods security portals. A person passing through the light curtain changes the time-of-flight of the emitted light impulse. The person is counted. When several people pass through the monitored area – even if they are of differing sizes – they are also reliably detected and counted. Simultaneously, the LD PeCo detects which of the two curtains is passed through first and derives the direction of motion of the persons from this information.

Can be installed almost everywhere

The maintenance-free LD PeCo offers almost no restrictions regarding installation. The system can be installed outside passages or beyond any possible access, thus protecting it against damage or tampering. People can be reliably counted, even in high arcades in shopping malls, or in arrival and departure halls at airports, thanks to its range of 26 m.

insight**LINK**

You can obtain further product information with the attached card under:
INFO 115
or on the Internet at:
www.sick.de/insight/en
More about the LD PeCo:
www.peoplecounter.de
www.lase-systemtechnik.de

Picture: Domino Amjet

Luminescence scanners inspect steel pipes

LUT quality – defects seen and sawn

Steel pipes that are integrated into automobiles are subject to the highest quality demands. In order to ensure that only goods of "top equipper quality" leave the works, a major supplier relies on quality assurance and process control based on luminescence marking. This permanent, invisible labelling is detected during production and, in the warehouse, by SICK's LUT series of luminescence scanners.

>> As the purchasers of steel pipes, e.g. in the automotive industry, make the highest demands regarding the quality of the products, the pipes undergo a 100% inspection immediately after the production process. If defects are found, e.g. cracks, holes or adsorbed material, these areas are marked with a fluorescent paint. LUT luminescence scanners then check that the markings are present and possess a defined luminous intensity. The pipes are then stored, and subsequently removed from stock on receipt of customer orders. Any contamination of the pipe that may have occurred in the meantime, caused by dust or handling, for example, during which the marking may be exposed to impacts or gripping tools, have hardly any effect on the detectability of the markings.

Invisibly marked – reliably recognised

The steel pipes are cut into sections on automatic saws, according to the customer's instructions. During this process, the defect markings are again detected by an LUT unit. As LUT sensitivity can be adapted to the particular application by means of an adjustment element, any convection in the pipes, and its associated varying luminous intensity of the luminophores within the transmitted light spot generated by the LUT, has no effect on reliable sensor function. The insertion of the pipe in the saw is controlled on the basis of the reliably detected signal; the defective area is sawn out with maximum precision.

Seeing and sawing – both are possible with the LUT.

insight**LINK**

You can obtain further product information on the Internet at:
www.sick.de/insight/en

Pictures: RENA

The cleaning plant for silicon wafers

R|E|N|A

Position detection in the dipping pool

Underwater photoelectric switches optimise wafer handling

Underwater automation – the WT 4-2 photoelectric proximity switch with a Teflon®-protected housing and cable makes this possible. The sensor is in its element in the dipping pool of a cleaning plant for silicon wafers.

>> They came up with this effective solution at RENA Sondermaschinen GmbH in Gütenbach. RENA offers customer-specific solutions and standard plants for wet chemical processes under clean-room conditions. The underwater photoelectric switch was able to considerably increase process reliability during automatic wafer-handling in the wafer cleaning machine.

Multiple position detection

In the machines, a so-called Horden lift is used to dip 300 mm wafers in cartridges, among other containers, into a pool containing super-clean water. From there, a handling arm takes over transport of the wafer packets (removed from the cartridge) through the various process pools of the plant. In the past, neither the cartridge position in the pool, nor the end positions of the Horden lift itself, were monitored. This is now possible with the WT 4-2 Teflon® photoelectric proximity switch, considerably increasing handling reliability in the machine. Of fundamental importance for the use of the sensors were the complete tightness of the sensor housing and cable encapsulation, and the miniature design that permitted installation in the dipping pools (which offer limited space).

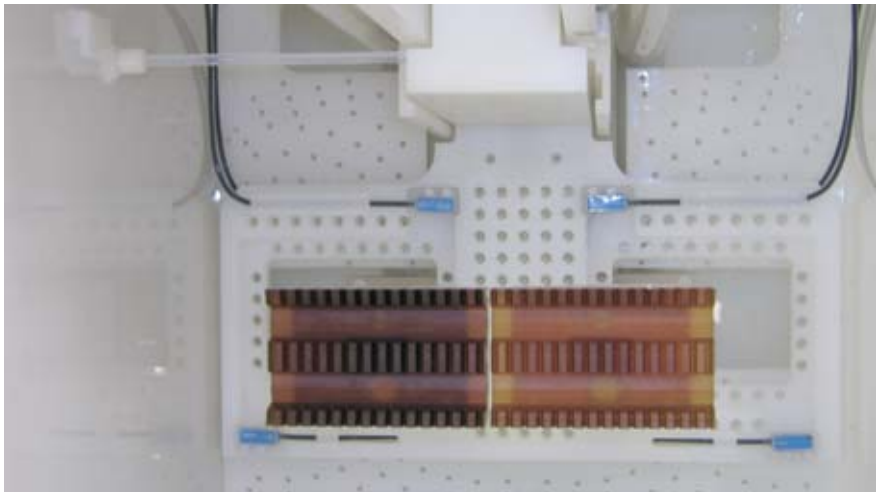
Two birds with one stone

RENA was able to "kill two birds with one stone" with the WT 4-2 Teflon® because, in another machine type, a detection solution used up to now could be replaced by precisely this "underwater photoelectric switch". Thus not only was another demanding application solved, but the variety of sensor types stocked at RENA could be reduced.

At RENA they are already looking forward to the new generation of WT 4-3 Teflon® devices. This will allow scanning distance adjustment from outside the pool while the sensor is in an installed state.

insightLINK

You can obtain further product information with the attached card under:
INFO 116
or on the Internet at:
www.sick.de/insight/en
More about the customer:
www.rena.de



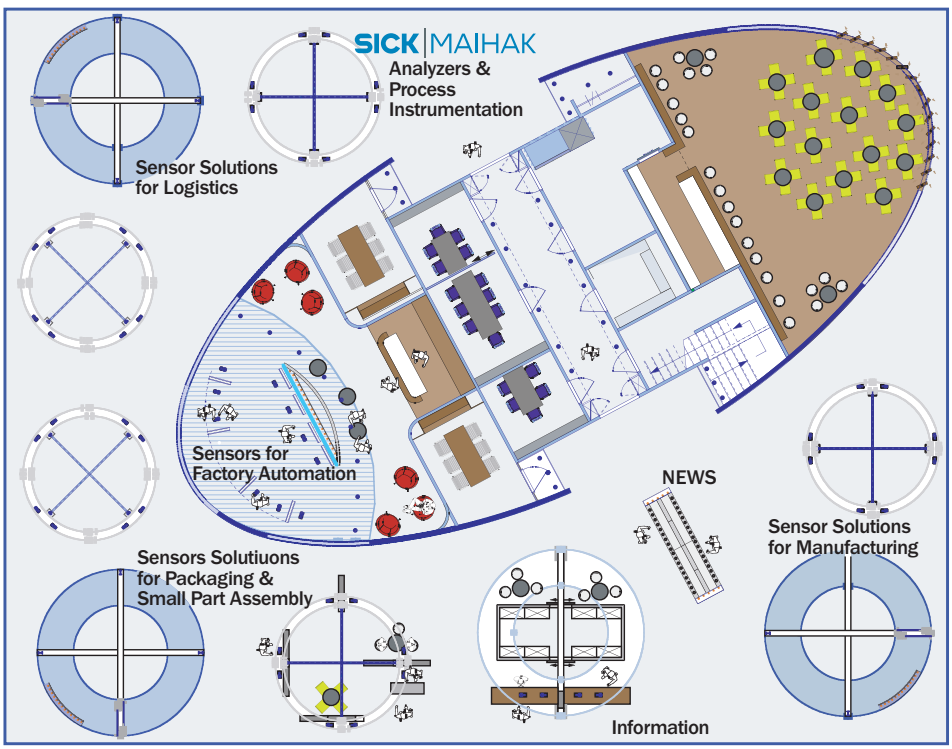
The WT 4-2 Teflon® "underwater" photoelectric switch in the dipping pool of the cleaning plant

The Hanover Industrial Trade Fair (HMI) 2005 – *the* technological event

SICK presents products and solutions for all areas of industrial automation

Visit us at Stand F54 in Hall 9. We look forward to seeing you!

The whole world of industrial automation is meeting again in Hanover from 11 to 15 April. More than 6,000 exhibitors from 60 countries are presenting their new technological developments for all industrial sectors at a total of eleven main fairs.



The new stand plan! More about SICK at the Hanover Trade Fair: ***www.sick.de/hmi***

>> SICK is participating in the two main fairs, Factory Automation and INTERKAMA+, with a wide range of products and applications.

In Factory Automation this year's emphasis is on "manufacturing", "packaging/small part assembly" and "logistics". SICK MAIHAK covers the analysis and process measurement segment within the framework of INTERKAMA+, with products and solutions for throughflow measurement, gas analysis, dust concentration and filling level measurement.

The highlights 2005

SICK offers you a complete overview of products and solutions for all areas of factory automation. This year's exhibition programme focuses, in particular, on:

- the third generation of photoelectric switches with revolutionary chip technology allowing remote requests and adjustment, parameter exchange, the monitoring of dirt and the identification of interfering signals
- vision sensors and smart cameras
- incremental encoders
- contrast scanners
- safety light curtains for the most varied of tasks
- a safety camera system for press brakes
- non-contact safety sensors
- miniature bar-code scanners
- hand-held scanners
- laser/volume measurement systems
- and much more besides.

And as it would be negligent to ignore the need to relax after busy days spent at the trade fair, we would like to refer you to the now-legendary SICK stand parties on 12 and 14 April from 6.00 p.m. onwards. We would be delighted if you could find the time.

Bundled system integration at Reute; Department Head Thomas Grützmacher

Customers profit from time and cost savings and through focusing

SICK MAIHAK bundles its system integration in Reute

Since October, SICK MAIHAK has had its own department for "system integration" in Reute, next to the Management Board and the Sales Management Department. This bundling of strengths offers customers distinct advantages.

>> Head of the new department Thomas Grützmacher, previously Production Manager in the Meersburg factory, knows: "The all-inclusive package from the planning to start-up of a system is a winning factor for system integrators and users alike. They no longer want to be concerned about each analysis component and their integration into a system concept, instead they are looking to buy a completely integrated system with clearly defined interfaces. It's much the same in the area of after-sales.

Through centralized planning and execution of system orders, incompatibilities and unnecessary costs are eliminated. The focus is clearly on the selection and realisation of the best solution for the customers: a fixed team of experts from different sites are involved with the system orders in Reute – from order acceptance through to delivery, from instrument cabinet to finished shelter. The team designs together, orders all the necessary components, tests and mounts the small and large analyzer systems in a large 700 m² hall, rearranged specifically for this purpose and for future expansion.

Thomas Grützmacher is proud: not even three months have passed and the young department is booming. "You can tell that the customers have confidence in us. The centralised completion of system orders has become routine, even in this area we compare favourably to our competition."

Sixteen orders have been planned, built and finished in the period from October until the end of the year. And more than twenty systems, many for customers in the Far East, are now in the pipeline – a clear increase.

One example of a successful project for the new department was a complete measurement container with analysis and process control equipment, including climate control and office furniture for a munitions incineration plant in the Russian Taiga. This customer, with his first system order at SICK MAIHAK, was impressed by the uncomplicated order processing and the local site test. "They immediately ordered an additional container and are promising more orders in the future," said a pleased Mr. Grützmacher.

>> SICK MAIHAK system integration: your advantages at a glance

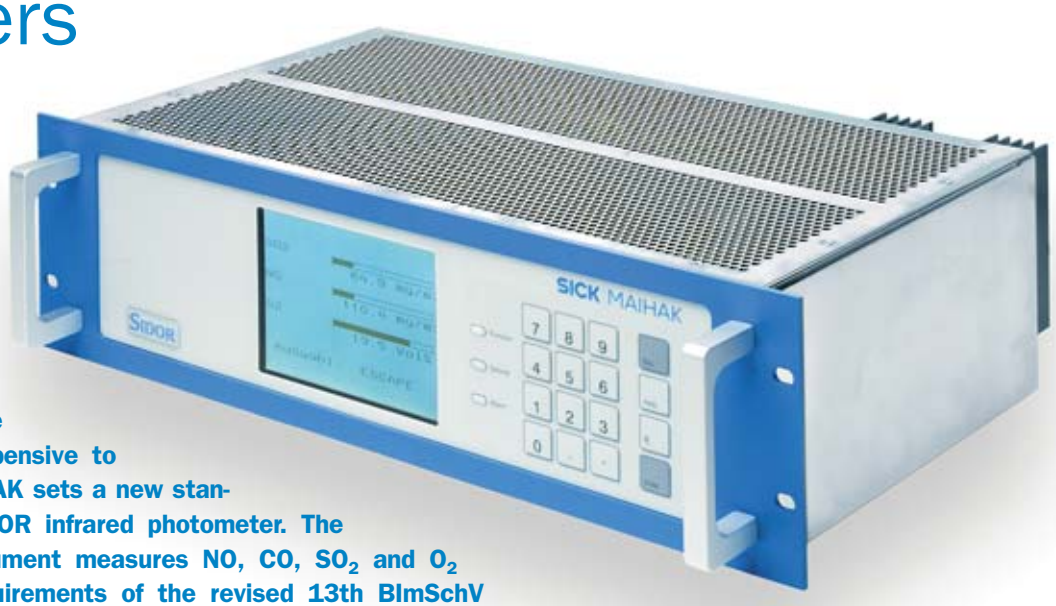
>> SICK MAIHAK has its own comprehensive range of analysis instrumentation products: in-situ or extractive gas analysis technology
>> We offer different measuring principles depending on the requirements, independent of one's own product portfolio
>> Broad expertise in a variety of measuring technologies and applications in process measurement technology
>> Focusing of system competences from all SICK MAIHAK facilities
>> Complete handling from consulting and engineering to start-up and service – all from a single source

www.sick-maihak.de

: SPECIAL

Simplified, better and really good value:

SIDOR sets a new standard for photometers



Long-term stability is better than ever before and at the same time simple and inexpensive to buy and operate: SICK MAIHAK sets a new standard with its brand-new SIDOR infrared photometer. The completely redesigned instrument measures NO, CO, SO_2 and O_2 according to the latest requirements of the revised 13th BImSchV (German Pollution Control Directive) as well as CH_4 and CO_2. TÜV approval will probably be completed mid-year.

>> NDIR (non-dispersive infrared) photometers determine gas concentration by evaluating light wave and temperature changes in a gas-filled detector when it is exposed to infrared light. The principle of measurement has been proven in use for more than sixty years; NDIR instruments represent nearly half of all gas measuring instruments in production and combustion plants.

"System operators need reliable products with long operating times and low operating costs. When it comes to emission monitoring in line with the environmental laws, they are required to purchase analyzers and to monitor continually and, as far as possible, without interruption," according to Product Manager Dieter Deggim. Up until now, the disadvantage was that the highly sensitive detectors often needed re-adjustment – usually with test gases or with a built-in calibration cell. "For the operator this meant a lot of expense, to keep the test gases ready at hand and ready to be delivered to the analyzer and maintain a high level of security" explains the SICK MAIHAK Product Manager. With a calibration cuvette on the other hand, the analyzer was more expensive and the high cost of testing with gases (several times per day or as little as once per week depending on the manufacturer) led to high operating costs.

SICK MAIHAK however, decided to thoroughly simplify and improve the measuring technology. The main task: stabilisation of the measuring values. Dust, wear, temperature influences or unwanted reactions to the materials used continued to cause erroneous measuring values. The zero point and end point of the measuring range could "drift".

In countless test runs, the SICK MAIHAK Development Department led by Dr. Michael Zöchbauer, reduced and optimised the many different materials used in the instrument. A dual success story: "Our developers were not only able to eliminate foreign influences but were also able to significantly reduce the cost of materials" emphasised Dieter Deggim. The measuring values are now automatically standardised with new up-to-date signal processing. This enormously reduces the effect of interference. The newly designed chopper wheel unit allows the use of a second optical module with an additional source, so that two gases can be simultaneously and independently measured.

The result of the general redesign is a detector stability and simplification hitherto impossible. This allows low-maintenance operation of the photometer for many months – without the need for test gas. Even the built-in calibration cuvette is no longer required: the SIDOR only needs a single-point adjustment once a week, which can easily be carried out with inert gas or ambient air.

Even the instrument repairability was dramatically improved. The measuring cuvettes are now symmetrically constructed and snap into the correct position. No complicated alignment is necessary. In the same way, the exchange of all of the other components has been simplified. "As with our S 700 instruments, a factory-based temperature adjustment is not necessary after repair, unlike some of our competitors' products. All repairs can be done locally", another customer benefit, Dr. Zöchbauer points out. The compact 19" enclosure can house one or two measuring modules including an optional module for electrochemical or magnetic oxygen measurement. A sample gas pump or a flow or moisture sensor can be installed in the same housing. Connection to the system is simplified using a number of digital inputs and outputs. **INFO 117**

: PRODUCT NEWS

Numerous new developments for the Hanover Trade Fair

Photoelectric switches are increasingly achieving more

New technological possibilities, together with the greater demands posed by everyday industrial conditions, have resulted in important new and further developments in a variety of photoelectric switch series. The main emphasis: greater performance, more compact housings and simpler operation.

>> All sensors are available for a wide range of applications in the classic industrial field, as they offer great ease-of-installation and user-friendliness.

W 14-2:
for standard industrial use

In the case of the new W 14-2 series of photoelectric switches this involves a further development of the proven W 14 family. The devices are a universal and reliable solution for standard industrial applications. The two photoelectric proximity switches are the highlights here. They are available in two versions: one is the WT 14-2 scanner with background blanking for ranges of 50 to 250 mm or 80 to 500 mm, the other is the energetic photoelectric proximity switch for 300 to 1,500 mm, in which an integrated teach-in function allows electronic adjustment of the scanning distance. The series, with IP 65 housings, is supplemented with the WS/WE 14-2 through-beam photoelectric switch with a range of up to 15 m and the WL 14-2 photoelectric reflex switch, that can reliably detect objects at distances of up to 6 m.

WLL 170-2:
fibre-optic series with greater speed

The detection of small objects, of objects in front of interfering backgrounds, of coloured marks and transparent objects are not the only strengths of the new WLL 170-2 fibre-

optic series. The sensor family, fully compatible with the predecessor series, also offers longer ranges, an enclosure rating that has been increased to IP 66, manual sensitivity adjustment by potentiometer, and a switching frequency that has been doubled to 2 kHz for even quicker processes. Three different reworked versions are available: the standard type with red light LED, a new device with a green light LED for improved detection of red-sensitive objects, and a version with a 10 kHz switching frequency for extreme high-speed applications. The WLL 170-2 has retained the connection system and user interface – both serve to simplify conversion to the new series.

MH 15:
for short and flush automation

Short housings and flush mounting capability – the new MH 15 photoelectric switches and proximity switches unite both features in a single device series. The sensors measure just 52 mm with axial light exit from the optics to the cable outlet – and it's only 14 mm more for devices with 90° radial optics! Thus this series is among the shortest photoelectric switch families in this performance class. Improved production techniques, modern construction tools and high integration density make this short design possible. This functional design, however, not only saves space, but also provides solutions that look good. One example of this is the flush M18 mounting, considerably simplified by a new type of plastic retaining clip. The flush installation not only offers design advantages with its discrete integration – it also prevents moving parts being damaged during the transport process or damage to the sensor itself.

VTB 18:
cylindrical photoelectric proximity switches for demanding tasks

The new VTB 18 with background blanking rounds out the V 18 series – the powerful family of photoelectric switches in cylindrical M18 housings. The device offers numerous advantages. These include the particularly small light spot, with which even narrow or dark objects can be reliably detected. The operating range of the scanners lies between 30 mm and 130 mm, whereby users can easily set "their" scanning distance by means of a potentiometer. The extremely precise background blanking is of particular interest: the unusually small transition zone between the scanning range and the background allows precise object detection without interference from any very "close" backgrounds. Thanks to the standardised M18 mounting concept, as well as the proven connector technology (an M12 device plug or connection cable) the VTB 18, as indeed the entire V 18 series, offers numerous opportunities for use regardless of the sector involved.

WL 11 UC:
the smallest universal voltage photoelectric switch

With the WL 11 UC, suitable for both direct and alternating voltage supply, SICK has rounded off its W 11 series with a robust photoelectric reflex switch designed for flexible use. A range of 7 m, a high level of detection reliability (even for objects with highly reflective surfaces) and the safe, electrically isolated, switching output are among the most interesting features of this, the smallest device in its class. By fulfilling the CE standard for interfering radiation (EN 61000-6-3) the sensor is also suitable for applications in residential and commercial areas – of interest, for example, as a sensor for controlling doors and gates.

insight**LINK**

You can obtain further product information with the attached card under:
INFO 118
or on the Internet at:
www.sick.de/insight/en

Analogue sensor for 50–500 mm

Compact distance measurement

>> SICK has rounded out its distance measurement portfolio with the DT 10 compact distance sensor in the proven W 18 photoelectric switch housing.

The device is designed for distance measurement at ranges between 50 mm and 500 mm. Measured values are transmitted via a 4 to 20 mA analogue output. In addition, the teachable switching output also allows transmission of a freely definable signal value. A further highlight: the basic functional parameters of the DT 10 are given fixed settings at the factory, so the sensor can also be put into operation without a user manual.

Versatile mounting and connector technology

The DT 10 offers the versatile mounting and connection technology familiar from the W 18 series of photoelectric switches, among others. Thus there is nothing to prevent the rapid installation and commissioning of the distance sensor, e.g. for detecting filling levels in hoppers, or for regulating slack in loops or webs. **INFO 119**

For courier, express and package logistics

Volume measurement system certified by PTB

A certified VMS 520 volume measurement system

The Federal Institute of Physics and Technology (PTB) in Braunschweig has certified the VMS 520 volume measurement system on the basis of the test parameters of the OIML R129 standard. A complete system capable of calibration can now be developed for courier, express and package logistics – and approved by national testing authorities – by combining a calibrated weighing system with bar-code scanners.

>> Significant technical features led to the certification of the VMS 520 with test certificate number D 04 / 1.6.01. Thus, for example, both the scale value and the calibration error limit are 5 mm – each based on a maximum conveyor speed of 2 m/s. The smallest distance to be measured is 50 mm – which means that even objects with an edge length of just 50 mm can be measured with calibrated accuracy.

Robust measurement gantry

The VMS 520 volume measurement system consists of two sensor heads with mounting brackets and the software for parameterisation, diagnosis and visualisation of the volume measurement system. The sensor heads are mounted on a vibration-proof gantry frame above a conveyor system moving at a rate of 2 m/s. They each emit a fan-shaped laser beam with an angular resolution of 0.125°. The time-of-flight of the laser beam is accurately evaluated in each sensor head to within a few millimetres. The sensor heads combine their measurement values (no supplementary evaluation unit is necessary) and thus determine the length, height and width of boxes or packages. The real-time transmission of the measurement data to the control system of the entire system can be carried out via the serial RS-232 interface or an Ethernet connection. As the VMS 520 is characterised by compact dimensions, the integration of numerous functions, and simple installation and commissioning it can optionally be integrated with other identification modules in a complete solution capable of calibration.

Improved and transparent distribution processes

Certified volume measurement systems are increasingly being used by courier, express and packet services (CEP) in distribution centres. They not only permit improvement of sorting, preparation and distribution processes but, as a result of their great accuracy, also offer transport service providers the opportunity to precisely measure and classify boxes, packages and other transported goods. Thus CEP companies are now in a position to calculate the actual transport services provided (instead of relying on estimates provided in advance by the consignors) and can, if necessary, submit follow-up invoices. Depending on the actual amounts involved, this can quickly lead to amortisation of the entire system.

insight**LINK**

You can obtain further product information with the attached card under:
INFO 120
or on the Internet at:
www.sick.de/insight/en

New hand-held scanner for mobile code identification

Grater freedom of movement thanks to Bluetooth

With the combination of bar-code or 2-D code reading and Bluetooth data transmission, the new IT 4620 and IT 5620 hand-held scanners literally bring movement to data acquisition.

>> Both devices have been developed for daily use in offices, warehouses, logistics, or even in simple industrial areas. Externally almost identical, the two devices differ in their applications.

For differing tasks

The IT 4620 has a 2-D image acquisition module and can thus detect both bar codes and 2-D codes omnidirectionally. The reading range is between 3.6 cm and 31.5 cm depending on the code, its size and module width. The IT 5620, on the other hand, operates with linear imaging technology and achieves reading distances of up to 1.1 m. Its intelligent algorithms also provide good reading results even with poor-quality bar codes. Both devices offer high scanning speeds and are thus superior to conventional laser scanners.

Bluetooth and batch function

Both hand-held scanners are equipped with the latest Version 1.2 Bluetooth data radio module to transmit the identified bar-code data. Its integrated frequency-hopping process ensures maximum data transmission security. The IT 2020 basis station can simultaneously communicate with up to seven hand-held scanners. If the IT 4620 or IT 5620 is in a silent zone, or outside the basis station's radio range of about 10 m, the devices automatically switch to so-called batch function. As the scanner can temporarily store up to 500 data sets (e.g. commissioning steps) the user can thus also continue to work during temporarily lost radio contact without interruption and lost time. When the scanner is again detected by the Bluetooth radio field the collected data sets are automatically transmitted to the basis station according to the first-in/first-out principle.

User comfort

Handling of the new Bluetooth hand-held scanner is characterised by a high level of ergonomy. Thus the devices automatically switch to Presentation Mode when they detect a bar code or 2-D code in the read window. The basis station is a combined radio and loading station. It can also be used as a stand mounting for temporary stationary use. The contacts point upwards to protect them from damage; LEDs show the current state of the battery and read results.

The combination of ergonomy, robustness, reading power and modern radio technology make the IT 4620 and IT 5620 the ideal data acquisition solution in offices, production, warehouses and logistics.

insight**LINK**

You can obtain further product information with the attached card under:
INFO 121
or on the Internet at:
www.sick.de/insight/en

The W 18-3 success story continues

The “Connect 3” march triumphantly

Can one construct photoelectric switches that are even more robust, even more precise, and even more intelligent?

>> What has already been successfully implemented with the W 18-3, has now been consistently continued with the W 4-3 miniature series and the W 27-3 all-round family. While, on the basis of its dimensions and the detection of small, transparent or highly reflective objects, the W 4-3 is aimed at applications in electronics, robotics, handling and pharmaceuticals, the W 27-3 series exploits its strengths – robustness and a wide variety of types and functions – in handling and warehouse systems, in the automotive industry and in the automation of doors and gates.

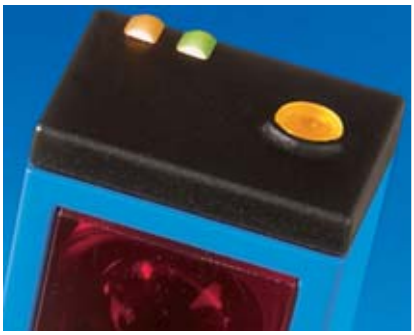
Greater self-sufficiency in industrial use

Factors involved in industrial use, that are often not all known during the planning and construction phase of a machine or plant, can have a considerable effect on sensors during subsequent operation. The new third generation sensors operate more self-sufficiently in the face of such factors, e.g. vibrations, active and passive sources of optical interference, and electromagnetic fields. The sensors’ increased resistance to chemicals and high immunity to temperatures from –40 °C to +60 °C play their part in guaranteeing the devices’ universal availability. Trouble-free worldwide use – no problem, with all-embracing approvals such as CE, UL, Gost and CCC.

Consistently implemented application expertise

Our close contact to customers is used to integrate the continuously rising demands made of photoelectric switches. Thus new technological construction processes open up new application opportunities that could only be achieved with great difficulty in the past – highly reflective or transparent objects, and varying brightness or colour contrasts, have no effect on the quality of detection and thus necessitate no special solutions or measures. Blind zones in close-range detection are a thing of the past thanks to the autocollimation principle; the substantially increased switching frequencies, on the other hand, belong to the future, as they have a positive influence on machine or plant productivity.

“Connect 3”: W 4-3, W 18-3 and W 27-3



Save time with our new customer interface

Standardised connector technology, teach-in and user-friendly interfaces with 360° indicator LEDs contribute towards rapid commissioning and the simple control of functions – the possibility of adjusting inaccessible photoelectric proximity switches via data transfer either directly from the machine controller on site or via remote monitoring, and thus independent of the distance, saves a significant amount of time for machine and plant constructors. The new “Sensor Hub” customer interface offers the unique advantage of remote diagnosis and remote adjustment. This enormously reduces costly machine downtimes.

“Connect 3”: the users are the winners – with the third generation of photoelectric switches from SICK.

insight**LINK**

You can obtain further product information with the attached card under:
INFO 122
or on the Internet at:
www.sick.de/insight/en

SICK now offers format adjustment

Positioning drive for rapid product changes

HIPERDRIVE®, the integrated positioning drive consisting of a motor, gears, an absolute measurement system, and performance and regulatory electronics, allows rapid automatic product and format changes in, for example, printing, packaging and metal processing machines. The advantage: greater flexibility and lower equipping times reduce operating costs.

>> Small batch sizes and frequent product changes affect the level of utilisation of packaging and other processing machines. Numerous adjustment and setting processes on rollers, limit stops or other equipment are frequently required before production can begin. Equipping times are correspondingly long if these are carried out manually, particularly for more complex machines with many axes that require adjustment.

Improved equipping with automatic format adjustment

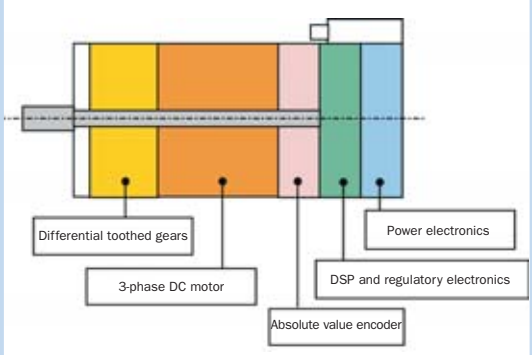
Time savings, the precision and reproducibility of the setting, fewer rejects, greater quality and a high level of operating reliability – the integral positioning drive HIPERDRIVE® (High Integrated Performance Drive) offers all these advantages. Its compact housing allows simple integration in new and existing machines. Turning moments of up to 20 Nm and a drive rotational speed of up to 35 min^{-1} meet the constructional requirements of machines. Absolute detection of the angle of rotation provides a clear absolute positional value for every axle position – so no reference run is necessary on machine start-up. Integration of the positioning drive in the existing plant network takes place via a Profibus-DP clip-on module. The high IP 65 enclosure rating allows use of the HIPERDRIVE® positioning drive even under harsh environmental conditions such as those caused, for example, by paper and wood dusts, sanding, or the abrasion of rubber.

Better than hand wheels, though no replacement for servo drives on process axes

Machines can be quickly readjusted to as many formats as necessary with HIPERDRIVE® – with highly accurate adjustment and repeatability. It represents the optimum alternative to hand wheels, regarding technical and economic performance, particularly in those machines with several adjustment axes. HIPERDRIVE® is no replacement for the classical servo drives on process axes on machinery, but rather a reasonably priced alternative for automating the adjustment of auxiliary axes. Features such as its r.p.m. range, output performance, high stopping moment or low cabling requirement have been specially designed for this application.

insight*LINK*

You can obtain further product information with the attached card under:
INFO 123
or on the Internet at:
www.sick.de/insight/en



System structure with HIPERDRIVE®

SICK sensors for all system environments

Open for almost every fieldbus

Open communication is all-important – also, or particularly, in automation technology. SICK is an active participant in numerous bus projects, and designs its sensors to be open for all system environments.

>> The best fieldbus is always the one that the customer uses in their machines and plant. Good sensors must therefore not only detect reliably, but also be able to participate in bus "traffic" – like the MLG automation light grid, the KT 8 CAN contrast scanner or the sensors of the new AS-I stainless steel field module.

MLG
– the new bus stop for Profibus

The Profibus in the proven MLG light grid is new. What's so special? The bus node is entirely accommodated within the sensor housing. Doing away with the otherwise usual external gateway makes "driving" the Profibus with the MLG light grid particularly economical, as the integrated bus connection saves about 200 Euros. Whereby users need not wait long for "departure" of the MLG Profibus. The MLG Profibus has its own PNO number to register the new participant in bus traffic in the machine controller. The corresponding GSD file, that allows the sensor's data output to be interpreted by the PLC, can be downloaded at www.sick.de in the download pool. The device-specific parameters and application-specific measurement functions can be selected via a menu, so the MLG Profibus is ready for operation after just a few mouse-clicks. If required, all device parameters can be transmitted to further light grids via Profibus – they are stored in the machine controller.

Accomplished scanning and communication with the

KT 8 CAN

"Parameter download" is also a key phrase for the KT 8 CAN contrast scanner. The CAN interface intelligently integrates the sensor in the control system of, for example, a packaging machine. The advantage: the sensor settings stored for the various types of packaging – generally with differing contrasts – can be automatically downloaded as parameter sets for each new order. This prevents spurious settings and reduces equipping times. Processes can be automatically readjusted and thoroughly documented, e.g. in the pharmaceuticals sector in compliance with CRF21, Part 11. Finally the CAN interface allows rapid remote diagnosis via modem.

Automation with no sell-by date …

… promises the new AS-Interface ASI-S24261 field module in the IP 69K stainless steel housing. It allows up to four sensors to be connected to the AS-Interface bus in the harsh food & beverages sector. There are also four digital outputs available for actuators. High temperatures of up to 70 °C and aggressive cleaning regimes, e.g. steam hoses, have no effect on the function of the fully encapsulated interface module.

As a whole, in addition to the above-mentioned sensors, SICK's range of products offers a wide variety of fieldbus-enabled components for automation, safety and identification technology.

Open communication – for all system environments

insight**LINK**

You can obtain further product information on the Internet at:
www.sick.de/insight/en

Precision optimises processes

Laser navigation extends the range of uses of free-moving vehicles

A 360° field of view, ranges of up to 28.5 m even in dark hall areas, and a high level of accuracy thanks to a resolution of 0.1° make the NAV 200 laser measurement system an automatic navigator for automated guided vehicles.

>> The NAV 200 is an actively scanning, highly precise laser measurement system. The measurement system's scanner emits an invisible light impulse through 360° and measures the time to reception of the reflections from reflectors. Like a GPS (global positioning system), the NAV 200 determines the current vehicle position in the area as an LPS (local positioning system).

Programmed for precise position detection

The angular accuracy of 0.1°, combined with precise distance measurement and knowledge of the position of the reflectors, provides a high level of position accuracy. Thanks to the NAV 200, the vehicle always knows where it currently is, even with strong illumination or deliberate dazzling. The high position data rate of up to 8 Hz simultaneously allows rapid orientation of the vehicle. The measured values provided by the NAV 200 are transmitted via an RS-232 interface to the vehicle controller, which carries out a comparison of position and, if necessary, initiates a change in the path taken. Alterations in routes, for example because hall use has been redesigned, can be taken into account by a simple software parameterisation in the onboard computer.

NAV 200 – rather fulfilled navigation than failed navigation. **INFO 124**

Hologram detection on packaging

Optoelectronic brand protection

Holograms are increasingly being used for the forgery-proof labelling of expensive branded articles, in particular. With the hologram sensor, for the first time SICK is presenting a scanner at the Hanover Trade Fair that reliably detects holograms during attachment to the packaging, or for subsequent inspection of authenticity.

>> The term "holography" comes from the Greek: *holos* – the whole, and *graphein* – write. Holography is a technique found in physical optics, with which objects drawn in three dimensions are attached to two-dimensional carriers, e.g. packaging, by means of laser light.

Hologram detection is very demanding

Even though imprinted holograms sometimes light up in colours, a colour sensor would be useless as the colour is not attached, but only exists through the bending of incident light. The detection task is made even more complicated because the hologram is frequently highly reflective, as is the background. But holograms can be reliably detected by the KT 5 Display contrast scanner both during their attachment by machine, and during a packaging process.

Special strengths

This is possible because the device exploits its special strengths that are essential for hologram detection. Thus both the highly reflective hologram and the particular background can be very precisely taught-in. Visualisation, and the fine adjustability of the switching level via the display, allow extremely accurate and reproducible setting of the hologram sensor. Automatic dazzle adaptation also ensures maximum detection reliability and machine availability even with highly reflective carrier surfaces.

>> Facts

Incidentally: the first hologram was invented as early as 1948, but it was only in 1960 (with the invention of the laser) that holograms could be produced by machines. The inventor of holography, Dr. Dennis Gabor of Imperial College in London, received the Nobel prize for Physics in 1971.

The M 4000 Standard multiple light beam safety device and the C 4000 Palletizer safety light curtain

Supplementary advantages are in greater demand than ever

Maximum safety with more features

Nowadays, those who use safety systems naturally do not want to have to do without economic efficiency. New solutions thus also offer new features with which processes can be structured not only more safely, but also more efficiently. The C 4000 Palletizer safety light curtain, the new M 4000 Standard multiple light beam safety device, and the non-contact T 4000 Multi RFID safety switch are proof of this.

>> "Automatic safety" is no longer sufficient. Users want "safe automation", i.e. to design the safety in such a way that it does not impair machine performance, but actually improves it. The new "4000s" from SICK thus offer correspondingly advantageous features. They all offer category 4 compliance with IEC 61496, and SIL 3 according to IEC 61508.

The C 4000 Palletizer – lower costs, greater availability

The idea is simple: by using one sensor pair instead of an entire "Christmas tree" of sensors, the C 4000 Palletizer monitors the pattern of a pallet, or goods on the pallet. For this purpose, the system has a dynamic, self-learning blanking function with which the system reliably differentiates between pallets and persons passing into a protected area. This takes place either by evaluating the blocking of individual light beams or by detecting object or distance patterns. The user-friendly system concept also proves itself during commissioning: unpack, install and the C 4000 Palletizer can already detect common Europallets and grid boxes. No programming work is necessary. And because there is little to plan, specify, add on structurally, wire up, and monitor, the system saves our customers a lot of money: installation and operating costs are up to 40% lower compared to access protection with conventional muting solutions – this often amounts to several thousand Euros.

A non-contact RFID T 4000 Multi safety switch

The T 4000 Multi – with separate door signal outputs and tolerant response behaviour

Whether reed switches, inductive sensors or transponders – SICK is widely represented with non-contact safety switches. The latest development is the versatile T 4000 Multi system. The familiar and proven principle of other products in the T 4000 family is exploited here, too: a sensor continuously reads out the fixed programmed number of the actuator – a fully encapsulated RFID transponder. Opening the particular protective door interrupts reading and leads to a safe machine stop. The individual coding of the actuator also ensures that the system is highly tamper-proof. Two different evaluation units are available for the simultaneous connection of two or four sensors. Often requested, and now achieved with the T 4000 Multi: separate door signalling outputs, with which each connected sensor can be assigned to the particular door and evaluated. The sensor's large response zone of 15 mm also offsets tolerances between the door and the protective fencing, reliably preventing false alarms. Integration of the reset and external device monitoring functions in the evaluation units does away with the need for external relays.

The M 4000 with numerous new plus points in control and use

The new M 4000 Standard multiple light beam safety device offers a stiff, non-distorting profile with three mounting slots for variable installation; LEDs on the receiver housing; and an optional bus connection via an integrated AS-Interface Safety at Work interface. Configuration buttons on the device and the integrated laser alignment aid allow comfortable and reliable adjustment. Plant commissioning times are thus considerably reduced. In operation, the configurable status output offers the possibility of transmitting operating information on the M 4000 Standard directly to the machine control system for diagnostic purposes. A further highlight is the separate connection for the reset button. As signal evaluation takes place in the device itself there is no longer any need for the feedback of the signal from the switching cabinet to the hazardous area that is required by other systems. All cabling costs are thus substantially reduced. The new performance features, long ranges, and numerous beam combinations make the device a worthy successor to the MSL multibeam photoelectric safety switch that has proven itself in the field over many years.

Whether the C 4000, M 4000 or T 4000 – safety may be the most important aspect of all these systems, but it is not the only one. It is the supplementary advantages that make these safe sensors and systems such modern solutions. The fact that despite all the functions available, appearance need not be neglected is proved by the M 4000: it has won the IF Design Award 2005

insight**LINK**

You can obtain further product information with the attached card under:
INFO 125
or on the Internet at:
www.sick.de/insight/en

Ten-fold improvement in precision

Improved measurement in the µ-range

The OD max, the latest sensor in the displacement series, sets a new standard. The sensor's accuracy, which has been improved by a factor of ten, opens up undreamed-of opportunities for automatically checking the presence of surfaces in industrial situations.

The optical head and evaluation unit of an OD max displacement sensor

>> The OD max is available in three variants for operating distances of 30 mm, 85 mm and 350 mm.

High-end solution for demanding quality assurance

Highly accurate quality inspections during which even the lack of the smallest of parts, or a fine application of material, is detected reliably and with µ-accuracy can now be carried out with the OD max, e.g. in electronics production or during surface inspections. This has been made possible by a quantum leap in measurement accuracy, which in this device has been improved by a factor of 10 compared to other systems – to its current 0.1% of the measurement area. The OD max can be operated in two different modes: in Basic Mode for rapid use, or in Advanced Mode for applications requiring special fine tuning.

Flexible sensor concept

The evaluation logic of the OD max (i.e. the processing of measurement values and a variety of fundamental arithmetic functions required, for example, for measuring thickness) is located externally in a separate unit. Thus the optics head could be kept extremely small – and therefore also suitable for installation where space is limited. A further advantage: two sensors can be connected to a single evaluation unit, with settings made via its control panel.

Thus the OD max is precisely what is needed when small objects require highly accurate measurement.

insight**LINK**

You can obtain further product information with the attached card under:
INFO 126
or on the Internet at:
www.sick.de/insight/en

Specified for significant demands

New sensors for colour detection

Colour is an important decision-making criterion in many processes. Whether for highly precise detection or for colour recognition on bottles – SICK is presenting new sensors for both tasks at the Hanover Trade Fair and at the interpack in Düsseldorf.

Left: the CS 8 color sensor
Right: the CVS 2 color vision sensor

>> Containers, crates of drinks and packaging are typical examples of objects that are identified, transported or sorted in industrial applications on the basis of their colour. Color sensors that operate with point-based detection are mostly used here, as the colour is relatively evenly distributed over the object and the sensor's light spot thus always detects the "correct" area. On the other hand, tasks such as checking the degree of browning of meatballs, or the presence of bottle tops and seals, the detection of logos, or checking the design of labels, are examples where color sensors come up against their limits. The reasons: the colour information required is not always located in an easily evaluated colour point; the sensor's light spot does not always detect the decision-relevant area of an object. And if the colour also has to be detected over longer distances then color vision sensors, that detect and evaluate a roughly postcard-sized rectangular light field, are the right choice.

SICK has developed new sensor solutions, characterised by improved performance data and even simpler operation, for both types of colour detection.

CS 8: colours brought to a point

The new CS 8 is the top-of-the-range of the CS series. For the first time, a choice of up to four colours can be signalled via the switching outputs – with a short response time that also permits rapid machine cycle times. The high colour resolution and fine adjustment of sensitivity and detection tolerance even allow differentiation of very similar colours. Operation of the CS 8 also sets a new standard. The LED indicators, separated according to reception channels, show which channel is activated. The bar display provides machine operators with information on settings such as colour quality, colour tolerance and detection reliability. Connection compatibility with the CS 1 and CS 3 series allows simple conversion to the CS 8.

CVS 2: the far-sighted 2-D colour sorter

Area colour detection is the strength of the new CVS 2. This color vision sensor, in its photoelectric-switch-sized IP 67 camera housing, is capable of detecting and sorting up to 15 colours over scanning distances of up to 270 mm within its large field of view (40 x 40 mm to 100 x 115 mm). Digital video signals, and important operating data and parameters, supplied by the CMOS chip are displayed directly on the colour monitor of the CVS 2. Together with programming of the colours to be detected (via an interactive, easily understood teach-in menu) this all makes commissioning particularly easy. The CVS 2 also offers many opportunities on the outputs side. In addition to two switching outputs, the sensor can exchange entire data strings (for colour detection) with the connected controller via the serial interface. Moreover, as many parameter sets as required, for example, can be downloaded to the device from a PC.

Whether CS 8 or CVS 2 – the same applies to both: on your colours, get set, go!

insightLINK

You can obtain further product information with the attached card under:
INFO 127
or on the Internet at:
www.sick.de/insight/en

Revolution in the world of image processing

SICK/IVP presents the world's first 3-D smart camera

Three-dimensional object inspection and checking of features – the freely programmable IVC 3D industrial vision camera is suitable for the solution of the most varied of industrial tasks. What in the past necessitated expensive camera and illumination systems can now be simply solved with the world's first 3-D smart camera.

>> The enormous application experience of SICK/IVP, particularly in industrial image processing, has been consistently exploited in the development of the world's first 3-D smart camera.

Integrated laser optics offer many advantages

Unlike conventional image processing systems, the 3-D smart camera is capable of detecting geometrical features regardless of fluctuations in contrast. The system operates with a line of laser light, whose reflection is evaluated using a triangulation process. The laser optics are integrated directly in the housing in order to avoid, as far as possible, the often difficult selection of the appropriate illumination. This results in the further advantage of a stable and uniform geometry between the illumination and the camera throughout the entire inspection process.

Precise detection even at varying speeds

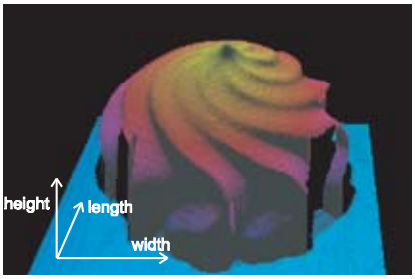
Up to 5,000 profile sections per second are combined to create a real 3-D image. This is also possible even if the test objects pass the measurement window at different rates. This is no problem for the new IVC 3D because an incremental encoder can be connected via an analogue input to measure speed and position. Thus objects can be detected with a high level of precision even at differing speeds.

Well-known image processing expertise can be exploited

The IVC 3D is available with measurement areas of 150 x 50 mm² (with a resolution of 0.1 mm) or 600 x 200 mm² (with 0.5 mm resolution). The height information is "encoded" as grey values during evaluation of the image. This allows users who want to implement their specific solutions with the 3-D smart camera to use the software tools familiar from the IVC 2D.

Versatile use

Freely programmable and suitable for a wide range of uses, the IVC 3D is the ideal solution for numerous inspection tasks in the food and packaging industry, in production processes, or robot and handling systems, among others. For users with expertise in image processing, the 3-D smart camera is a flexible and (thanks to the comprehensive library of image processing functions) individually programmable alternative to conventional 3-D image processing systems – as well as being extremely economical.



The world's most beautiful 3-D chocs

IVC 3D – so that the confectionery is always in the right place in the box of chocolates, or the profile strip is kept in shape. **INFO 128**

Profile sensor for quality assurance

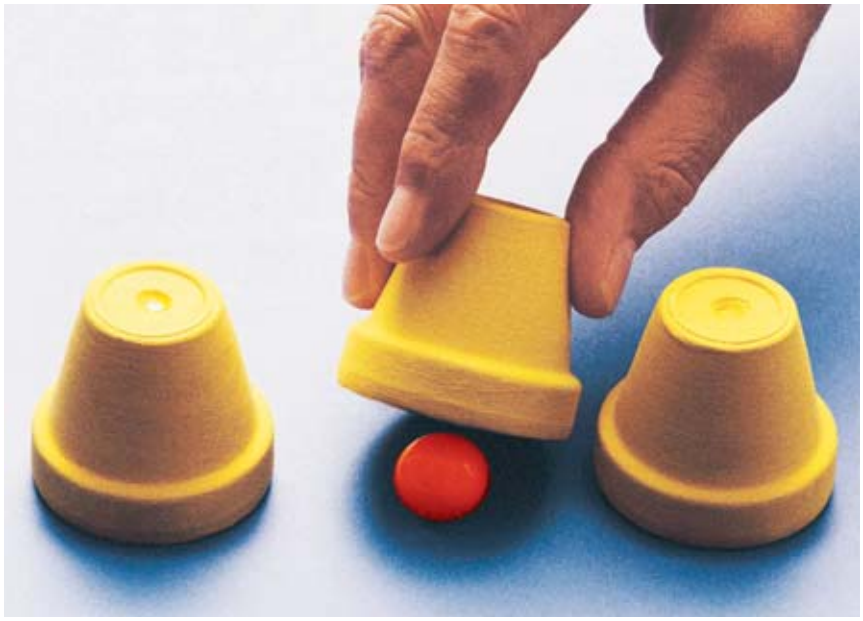
The professional for profile detection

>> SICK presents the Profiler profile sensor for applications in which edges, openings, bulges or other geometrical shapes provide height information that is the measure of all things.

The Profiler is designed as a stand-alone device with integrated evaluation, and operates like a light-section sensor. Laser optics generate a 30 mm long line of light over the target object, e.g. a line of glue or an opening, at operating distances of 100 +/–25 mm. The Profiler's triangulation principle allows distance-independent profile detection. As a result, fluctuations in the height of a band conveyor system, for example, have no effect on the Profiler's function and accuracy.

Professional profile evaluation

The Profiler's colour display shows what the 2-D receiver element has detected and thus permits precise adjustment of the sensor. Even difficult profiles can be detected with great accuracy as a result of the device's high resolution in the micrometer range. The three switching outputs – which signal, for example, the exceeding of taught-in or programmed tolerance values – and the 4 to 20 mA analogue output supply the downstream plant controller with the measured values required for a quality assessment. **INFO 129**



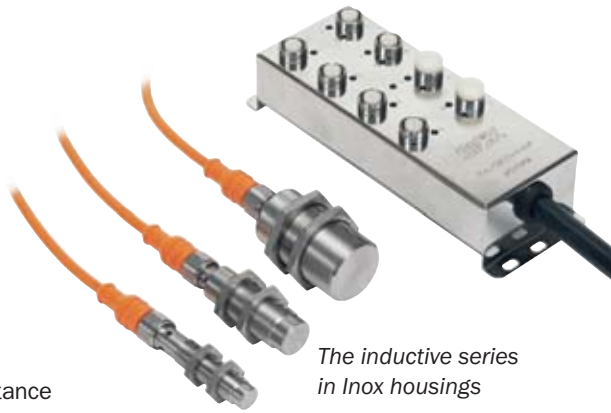
Revealed: SICK presents new non-optical sensors

The CQ 28 capacitive proximity switch

The ultrasonic senor UC 12 in a W 12 housing

New ultrasonic, capacitive and inductive sensors

New products and innovations in Inox



The inductive series in Inox housings

SICK has further expanded its programme of non-optical sensors for object detection. All sensors offer users interesting potential advantages in their target applications.

>> There are a range of conditions including, in particular, harsh environmental conditions or lack of direct optical contact with objects, in which non-optical sensors are the better choice.

UC 12 – an ultrasonic sensor in the popular W 12 housing

The UC 12 is a compact ultrasonic sensor that is ideally suited for operating conditions in which, for example, dust, dirt or coloured vapours are present. A further advantage of the UC 12 is the detection of transparent objects or liquids. With its teachable switching point and rotatable connection plug, the sensor offers the ease-of-installation and user-friendliness for which SICK sensors are so well known.

CQ 28 – a flat capacitive sensor with long switching distances

Detecting filling levels in tanks, containers or pipe systems is the domain of the CQ 28 capacitive proximity switch. With its long switching distance of up to 10 mm, the sensor detects liquids and bulk materials through non-metallic walls. As a result of its flat housing of just 5.5 mm the CQ 28 offers numerous mounting options, e.g. sunken installation in a groove, or fixing with a clamp fitting. Its IP 68 enclosure rating and particularly high EMC ensure reliable function under almost all operating conditions.

The IM series: inductive innovation in Inox

The inductive proximity sensors of the IM series in their Inox housings are of particular interest to the food and beverage industries. They are used, among other things, for detecting objects on accumulating conveyor sections, and in filling or closing systems. In addition to the fully encapsulated stainless steel housing in V4A 1.4404, the sensors' special highlight is their triple switching distance, which provides a greater detection range and thus allows protected installation. Together with appropriate plug connections and connection boxes, the various IM sensors form the "Food & Beverage" solution package with enclosure ratings of IP 69K.

Optical or non-optical – SICK's complete programme is proving optimal for increasing numbers of users.

insight**LINK**

You can obtain further product information with the attached card under:
INFO 130
or on the Internet at:
www.sick.de/insight/en

The Ironbridge Gorge Museums in England

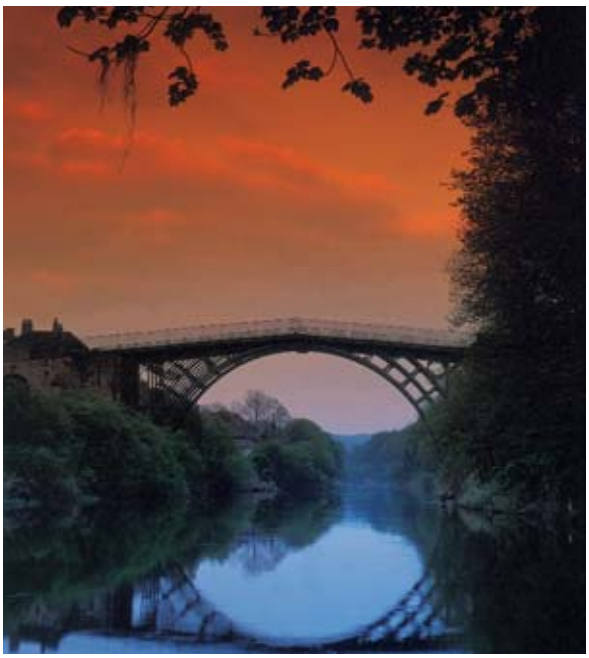
Experiencing the industrial revolution live

Ten different museums on the industrial revolution and developments that have taken place up to the present day are united in the Ironbridge Gorge Museums in the English county of Shropshire. Visitors are offered a variety of topics, some with interactive exhibits, ranging from iron smelting to robotics.

>> The gorge on the River Severn was the centre of the industrial revolution over 300 years ago. In 1967 the Ironbridge Gorge Museum Trust decided to protect this legacy for future generations. 21 years later the gorge has been declared a World Heritage Site.

Tour around historical developments

It is best to start the tour at the Museum of the Gorge where there is a model of the valley several metres long showing all its industrial production sites. Then visitors to the Museum of Iron can experience interactively how Abraham Darby was the first to smelt iron (the starting material for bridges or locomotives, among other things) in 1709 with the help of coke. By the way, two of Darby's houses can still be seen: Rosehill House, restored as it was in 1850 and Dale House, in which Darby's grandson planned the construction of the iron bridge that visitors still use today to cross the gorge. It is the largest individual exhibit. In addition to mining and working iron, the Severn Valley also supplied clay, which was used for the production of ceramics and porcelain. The Coalport China Museum, Jackfield Tile Museum and Brosely Pipeworks show a wide range of products (e.g. clay pipes, fine china and decorative tiles) and explain how they were made. The Tar Tunnel is a further attraction: originally intended to provide access between the Blists Hill mines and the River Severn it was found to be a source of natural bitumen, which still seeps from the rocks there. Finally, at the Blists Hill Victorian Town, visitors are taken back in time to over one hundred years ago: they can pay with pre-decimal token coins, listen to conversations between costume-clad characters going about their daily business, see how medicines and pills were prepared in the pharmacy, or hear gruesome tales around the dentist's chair and in the doctor's surgery.



Pictures: Ironbridge Gorge Museum

Finish one's journey through time at the Enginuity technology centre

The newest museum, Enginuity, is far removed in time but only a short distance from the Victorian lifestyle. Accommodated in a period-restored factory hall, the interactive design and technology centre provides information on today's technology. Electricity generation, robotics, electronics, vehicle technology and many more topics show where the industrial path has led from the early days of the Ironbridge Gorge.

insight**LINK**

Further information on the Internet at:
www.ironbridge.org.uk

Independence, Innovation, Leadership and Sensor Intelligence.

“Demands we must meet; promises to our customers and partners”

SICK Board members Dr. Robert Bauer and Anne-Kathrin Deutrich (spokesperson for the Executive Board)

Growth is an indicator of successful companies. And the greater the growth, the greater the expectations of the aims and the future – not just those of employees but also those of external partners. SICK insight spoke with SICK Executive Board members Anne-Kathrin Deutrich and Dr. Robert Bauer about the significance of the corporate statement for the company’s relationship to its customers.

SICK insight: Why does SICK make a corporate statement and what is its general aim?

Anne-Kathrin Deutrich: We have not simply provided ourselves with a corporate statement, but analysed the long history of our corporate culture and formulated our identity and aims in this statement. Whether independence, innovation or leadership – SICK has only been so successful during the last 50 years because these values have been active components of the corporate culture. So the statement did not need to be invented but “merely” analysed, supplemented by the long-term aims of the company, and succinctly formulated. The intention is to harmonise employees and the environment with the company now and in the future. Simultaneously, of course, it also serves as a confident positioning of SICK in the automation technology market.

SICK insight: What significance does the slogan “Sensor Intelligence.” have in this context?

Dr. Robert Bauer: The slogan unmistakably shows our customers what they can expect from us: intelligent sensors. We are sensor specialists who employ new technologies in their innovations, come up with new solution possibilities, become increasingly intelligent through sensor technologies, consistently extend the state of the art, and thus display active leadership. All this, of course, only works when, like SICK, one also has the necessary independence to act autonomously and exercise free-will within the market. So you see: the technical content of our corporate statement and corporate culture are closely interwoven with one another.

SICK insight: Whether purchasers, system integrators or plant operators – what does SICK’s corporate statement offer customers?

Dr. Robert Bauer: Independence, innovation and leadership are values that play a major role for many customers. Our corporate statement promises that customers can rely on it and demand its fulfilment. We say: our products are open for all system environments. Customers can thus integrate the sensors as they want, because they can expect the interface options from us. We say: we open up markets with innovative products and solutions. Our customers

know that they are knocking on an open door when they come to us with new sensor requirements. We say: our technological leadership allows us to create superior customer advantage. Our customers know that they can rely on support from SICK if there are problems realising this promised advantage. Then there are the non-technical aspects that can be grouped together under the term "security". Will the company still exist in ten years? How dependable is the company? What value do its employees' statements have? Can one rely on the entire package "SICK"? The corporate statement communicates a clear answer: yes. And our "we" statements make it clear that we are actively working on the further development of these values – that are of such importance for our corporate culture.

SICK insight: Those are very clear, strong statements. How do we internationalise these demands?

Anne-Kathrin Deutrich: You have raised an important point there. Our subsidiaries are responsible for about 70% of sales worldwide and are ahead in many markets. In the past, our recipe for success was: worldwide leadership with local expertise. And this is retained in the corporate statement. Many employees in our subsidiaries have been actively involved in the analysis and formulation of the corporate statement. They contributed their ideas and now implement them autonomously locally. This will undoubtedly take place at differing rates and with differing intensities – but the catalogue of joint values, and the definition of joint aims, have been formulated so that customers all over the world can treat the corporate statement as a promise and demand its application.

»In the past, our recipe for success was: worldwide leadership with local expertise.«

SICK insight: Thank you very much for this conversation.

Safety on more than 600 pages

Industrial Safety Systems' Product and Services Catalogue published

SICK presents its "Sensor Systems and Services for Safety Technology" on over 600 pages. The new catalogue is available in German and English and is not solely limited to products and services, but also provides valuable information on legislation in Europe and the USA. Numerous detailed application descriptions and a glossary with all the important terms round out the scope of the catalogue.

>> A clear and well thought out navigation concept ensures that, despite the large amount of information provided, every reader is guided to the right product or information as directly as possible. Regardless of whether the user wants to gain an overview, is looking for a particular product, or is dealing with the topic of safety technology for the first time – the new catalogue offers the appropriate navigation and the appropriate content.

The catalogue is naturally also available electronically – either as a CD or at www.sick.com **INFO 131**

SICK Training & Education goes international

Efficient, practically oriented and dependable, and enjoyable learning too – these are the aspects that guided the conception of the new Training & Education Programme for 2005 with a wide range of product training and seminars.

>> For the first time the offer includes course dates in several European locations such as Austria, Switzerland, UK. The programme is available in German and in English.
Further information can be obtained on the Internet at: www.sick.com/training **INFO 132**

Accredited for Germany, available for all countries

Safety Management for machines and plant

Safety provided by SICK systems and services can be found on thousands of machines and plants worldwide. This is no coincidence, but the result of the consistent implementation of an international Service Management for machines and plant.

>> Safety Management from SICK is based on the interaction between products and services. Sensors, integration technology and software, advice, on-site services and training – many small and large wheels mesh with one another.

Safety – co-ordinated and tailor-made

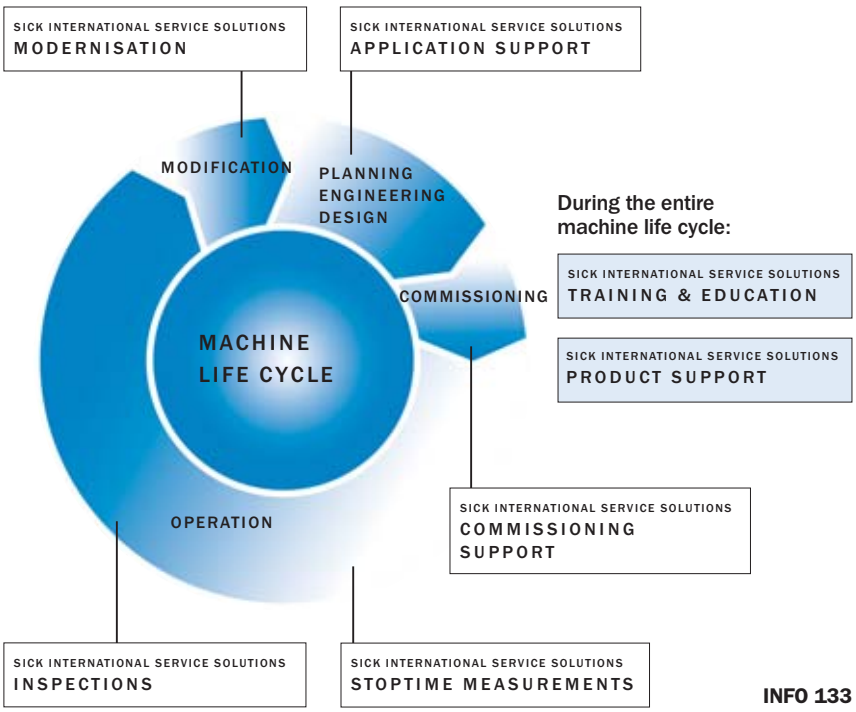
International Service Management covers the entire life cycle of machines and plant. During the planning phase, during installation and commissioning, during the entire operating lifetime, during modernisation – SICK Service knows the necessary safety solutions and measures, as well as the standards and directives on which they are based.

Services available internationally

The worldwide network, with more than 25 subsidiaries, provides global product support during the entire lifetime of a plant. Help is quickly available on site if the worst comes to the worst. In Germany, SICK is accredited (according to EN ISO/IEC 17020) for inspecting safety equipment in operation and carrying out stoptime measurements. This means: an objective inspection according to independently recognised methods.

Why Safety Management, why SICK?

Reduced time-to-market, increased machine availability, greater machine and plant productivity, as well as minimised liability risks arising from the Machine and User Directives – all these are frequently quoted arguments for a thorough and comprehensive Safety Management. Our experience of several thousand applications, our close co-operation with Trade Associations and standardisation committees, knowledge of the complex legal situation, and the expertise of safety technicians and engineers all speak for SICK. Safety sensors, system integration, training and all-embracing services mean SICK Safety Management from a single source – or from a web site:
www.sick.de/de/servicesupport



INFO 133

Golden girl

To the Youth World Skills Competition with SICK training

Sonja Kury extends the string of successes enjoyed by SICK trainees in the World Skills Competition.

>> The 21-year-old won the national competition in technical drawing and has thus qualified for the 38th Youth World Skills Competition in Helsinki in May 2005.

The German subsidiary in Düsseldorf

Since 1 January 2005

SICK Central Sales Department now autonomous subsidiary

SICK's Central Sales Department in Düsseldorf has been an autonomous subsidiary within SICK AG since January 1. This step was taken as part of the Group's international strategic alignment.

>> The Management consists of Dr. Robert Bauer, simultaneously a Board member of SICK AG, and the experienced sales professionals Rolf Hammer and Karl-Heinz Meisen. As the spokesman for SICK Vertriebs-GmbH, Karl-Heinz Meisen describes the principles of the new company: "We want to achieve even better market and customer orientation of our sales and service activities within the new structure. And this also represents a platform for further expanding the solution-oriented range of products and services offered by SICK."

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Greetings from Moscow

New subsidiary founded

>> SICK has recently begun supplying the growth markets of Central and Eastern Europe via a newly founded subsidiary, O.O.O. SICK in Moscow. General Manager Konstantin Tsarev sees considerable potential for using innovative sensors and systems in both factory and process automation.

Konstantin Tsarev, General Manager of SICK Russia

Stable economic growth and increasing automation in important manufacturing, processing and raw material industries – the Russian economy is increasingly sending "greetings from Moscow". So SICK decided to transfer its sales operation from a representative to its own sales subsidiary. Sales markets include the packaging machine, food and semi-luxuries, mechanical engineering, automotive, pharmaceutical and chemicals industries.

Managing Director Konstantin Tsarev believes that the petrochemical, gas and metal-processing industries offer further opportunities: "Many companies here want to attain world technical production standards as soon as possible using high-quality foreign sensors."

The Book Corner is by Andreas Gehri, Assistant in the Marketing-Communication Dept.

You won't believe your eyes!

Incredible visual illusions

>> While I was recently going for a walk with a colleague, two grey-brown animals were standing against a brown-green background behind some brown-black undergrowth on the opposite side of the valley. It was already getting dark. "Can you see the two ponies over there?" he asked. "No, but I can see the two donkeys." There followed a brief discussion about the differences between ponies and donkeys until, on approaching, we saw that there was actually one pony and one donkey. But we agreed on how uniquely we can perceive, with our sense of sight alone, our rich, three-dimensional world full of light, shadows, textures and colours, with moving objects of differing sizes and at varying distances. The perfect sensor!

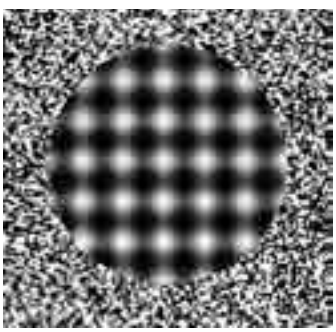
But despite all this, our perception can still occasionally play tricks on us! In his book "Incredible visual illusions" author Al Seckel shows us three hundred different optical illusions that make one doubt one's eyes!

First he explains just what an accomplishment our brains achieve when they collect complex information and interpret it, without conscious thought, to provide us with a complete impression of our surroundings. Then he surprises us with effects in which nothing is as it seems. Here are a few examples, have a go:

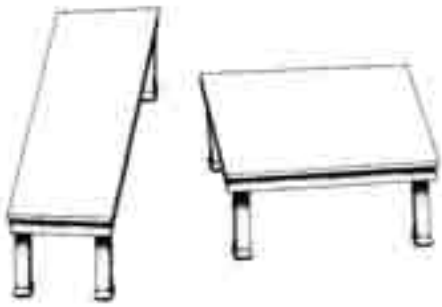
A brightness and contrast illusion:
Are the "light" and "dark" areas shown by the arrows different?
Believe it or not they are identical (check it out with ... yes, correct, a contrast scanner!)

A colour illusion:
Does it look as if the "brown" square on the upper face of the die is the same colour as the "yellow-orange" square in the middle of the face that is in shade?
If you are not sure, check it with a colour sensor – but the colours really are identical.

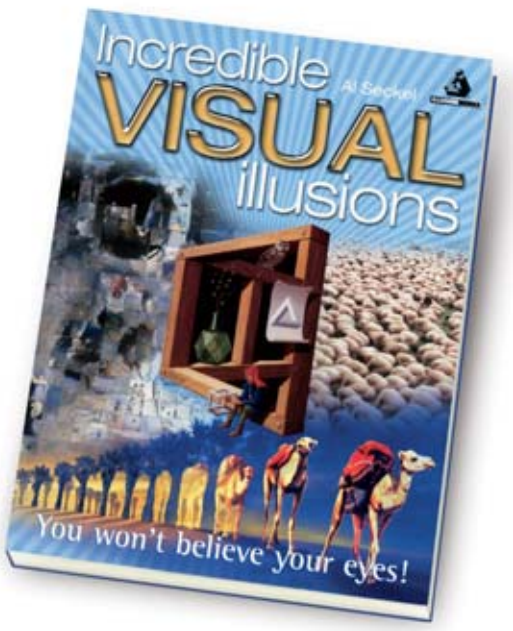
A motion illusion:
If you let your eyes wander over the illustration, the inner part starts to sway – luckily this doesn't happen to our 2-D code readers.



A perspective illusion:
These two tables are identical in shape and size. You don't believe it?



These, and many other examples, show that even after several million years of development, nature's error rate is not a perfect zero. An incentive for us. Because, more often than one thinks, one needs a good eye as well as "Sensor Intelligence"!



"Incredible visual illusions" is available from W. Foulsham & Co. Ltd, ISBN 0-572-03022-3

Trade fair dates Germany

Trade fair	Location	Dates 2005
HANNOVER MESSE	Hanover	11/04–15/04
SEMICON Europa	Munich	12/04–14/04
interpack	Düsseldorf	21/04–27/04
Control	Sinsheim	26/04–29/04
Motek	Sinsheim	27/09–30/09
POWTECH	Nuremberg	11/10–13/10
INTER AIRPORT Europe	Munich	11/10–14/10
CeMAT	Hanover	11/10–15/10
A + A	Düsseldorf	24/10–27/10
PRODUCTRONICA	Munich	15/11–18/11
ICE	Munich	22/11–24/11
SPS/IPC/DRIVES	Nuremberg	22/11–24/11

Trade fair dates Europe

Trade fair	Location	Dates 2005
AB&E Vakdagen	Hardenberg, NL	24/05–26/05
ET	Birmingham, UK	24/05–26/05
MOCON	Den Bosch, NL	30/05–31/05
Vision Solutions	Ede, NL	14/06–15/06
TOC Europe	Antwerp, B	14/06–16/06
SAWO	Posen, PL	20/06–23/06
ELEKTROTECHNIEK	Utrecht, NL	26/09–30/09
POST-EXPO	Paris, F	03/10–05/10
EmCerts	Bretby, UK	13/10–14/10
Scanautomatic	Stockholm, S	18/10–21/10
INTEGRALE VEILIGHEID	Utrecht, NL	08/11–10/11
EXPOQUIMIA	Barcelona, E	14/11–17/11

Trade fair dates worldwide

Trade fair	Location	Dates 2005
FIEE ELETRICA	São Paulo, BR	25/04–29/04
Sea-Port 2005	Busan, Korea	25/10–28/10

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